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ON
THE SIGNIFICANCE OF CARDIAC MURMURS.

READ AT THE ANNUAL MEETING OF THE KENT BRANCH, HELD AT TONBRIDGE, JUNE, 1918.

BY
CLAUDE WILSON, M.D.EDIN.,
TUNBRIDGE WELLS.

GENTLEMEN,—Four years ago you elected me to the presidency of your Branch. I expected to hold the position for one year, and I read an address on irregular action of the heart. Since then has come the Great War, and, as a minor consequence, I still hold the post to which you elected me, another being that during this period no general meetings have been held within the area of the Branch. The President of the Association has recently issued an appeal for the revival of clinical and scientific work in the Branches and Divisions, and I have thought that a paper on a sister subject which recent work has for the moment placed in a somewhat confused position might be of interest and of use.

Since the war cardiac murmurs have become rather generally suspect. Not very long ago any murmur, with the solitary exception of the pulmonary systolic, was regarded as a sign of serious trouble, either temporary or permanent, and the insurance offices still look askance at murmurs of all kinds. But a reaction has arrived, and there are, among those who have followed superficially the trend of recent research, men who are inclined to go to the other extreme and say generally that a murmur does not matter. The truth lies between these two extremes. Some murmurs do not matter, others do, and, in forming an estimate of their import, we should in the first place endeavour to differentiate between the varieties, and, in the second place, realize that in any case a murmur is only one sign, and must be read in conjunction with other signs and symptoms of cardiac efficiency or the reverse.

Here I may enunciate an aphorism, the result of recent work, which is already very widely held, and which I venture to predict will become universally accepted. It may be stated thus: "On no solitary sign shall any heart be condemned." There are those among the elders who may say that they have always held this view. But such are either very few or they deceive themselves, for there is no shadow of doubt that upon the presence of a systolic murmur, and especially a well-marked systolic mitral murmur, and in the absence of any other sign or symptom pointing to cardiac inefficiency, countless individuals have been refused or heavily weighted when applying for life assurance; have been cut off from participating in healthy sports and exercises; have gone through life under a sense of incapacity and often in the apprehension of a special liability to sudden death, and have perhaps suffered the apprehension of the condemned cell when an operation became imperative, because some doctor had told them, on this or equally slender grounds, that they must never take an anaesthetic.

Very early in my career I was confronted with a case which caused me to revise my outlook on murmurs. The patient was a young lady who exhibited the most remarkable murmur I have ever listened to. It was very loud—systolic—and heard equally all over the heart. It was also heard all over both lungs, in the carotids, in the abdominal aorta, and with diminishing intensity in both femoral arteries. The murmur had been discovered a few years previously by a general practitioner, and the advice of a specialist had been sought, with the result that the patient, at about 20 years of age, was told she must live on one floor, and must not walk uphill. Before that she had run about and danced. I was a young man, but I had had a fair experience of cardiac disease, as resident physician in a large hospital, and I began with caution to test the efficiency of this patient's heart. I made her swing her arms about, go up and down half a dozen stairs, and then more; and I found that, as her exercises increased, the pulse improved rather than the reverse, that no dyspnoea nor pain was caused, and that no cyanosis, oedema, nor albuminuria developed. I took her to see the late Sir William Broadbent, and stated my reasons for believing that the heart was practically sound, though I could not account for the murmur. He acquiesced, and suggested an ingenious explanation of the murmur—a minute congenital patency of the ductus arteriosus, leaving a negligible communication between the aorta and the pulmonary artery. Anyway the result was that the lady was restored to a life of useful activity, and that she lived for about twenty-five years more without any signs of cardiac failure, and died of pneumonia a few years ago.

This case made a profound impression on my mind. I argued that if so remarkable a murmur might exist in a heart which, for the practical purposes of life, was healthy, there were probably many murmurs which might be ignored; and I gradually came to the conclusion that a heart which could play football or go up Monte Rosa could not have anything very serious the matter with it. The argument I found applied equally to irregularities of the pulse; though, until the work of Mackenzie and Lewis enabled us to differentiate between the varieties of arrhythmia and to understand their varying significance, I had not the confidence I now possess regarding irregularity of action.

Functional and Physiological Murmurs.

In the case already cited, the murmur, whatever may have been the actual cause, was undoubtedly organic in origin. It illustrates a type which is extremely rare. To-day I have examined a case of a very different kind, but having this point in common: a systolic murmur which may not only with safety, but with great advantage to the patient, be ignored.

A young lady, working as a V.A.D. nurse, got tired, thin and easily fatigued, but showed no symptom referable to the heart. I saw her in bed, and found the first sound in the mitral area inaudible, and replaced by a blowing murmur which was conducted to the axilla. On sitting up in bed the same phenomena were observed; but, on standing up, the murmur completely disappeared, and the sounds became normal. On lying down again, the first sound disappeared and the murmur returned.

To what was this murmur due? We do not know. We may conjecture; but people never die from such conditions, and if they die and an autopsy is performed, the heart is found to be quite normal. "Functional" would be the term most commonly applied; but "functional" implies some derangement of function, and in these cases, where a systolic murmur is present in one position and not in another—a common type—there is, as a rule, no derangement of function, and Mackenzie prefers to call these murmurs "physiological." Under this heading, too, come the numerous systolic murmurs which are present one day and gone the next; and also many systolic murmurs which are constant and do not vary with position. It is not uncommon to find a very definite murmur which at the apex accompanies but does not replace the first sound, while at the base it is still more emphasized, and may render the first sound in both aortic and pulmonary areas inaudible.

Another murmur, rarer, is that which follows a normal first sound but stops abruptly with the second. Similar murmurs may be caused by valvular lesions; but if there is no history of rheumatic fever, and the heart responds normally to effort, the chances are that the murmur is not organic in its origin. But, even if it were, the valvular lesion which produces a systolic murmur and yet leaves a heart with good response to effort, and capable of riding a bicycle uphill, or other strenuous exercise, is probably trifling, and in such a heart the musculature is pretty certain to be healthy. Again, many of these murmurs are observed in children and adolescents, and in such there is a ready means of satisfying oneself that the heart is really sound. Sinus arrhythmia is common in the young, and can generally be readily induced. Make the patient take long, slow breaths pausing at the end of inspiration and of expiration. During inspiration the pace of the heart-beat will become accelerated, while during the later part of expiration, and during the pause before inspiration, the beats become very obviously slower and perhaps irregular. If this sign is present, the heart may very safely be pronounced sound. The following case is very similar to the last cited:

Some five or six years ago I saw a boy, aged 12, for some trifling ailment, and found he had a well-marked mitral murmur in bed, but that when he stood up it completely

disappeared. I took the view that the thing was of no importance and let him play football and cricket, and no harm resulted. Recently, for the purposes of this paper, I went to see him. He is 17½, well grown, and is working at wireless telegraphy. I examined the heart and found precisely the same condition present. Sinus arrhythmia was easily evoked, and this confirms the opinion I formed before I was aware of the significance of this condition.

Among the cautious commentators on this modern disregard of systolic murmurs in the young are those who hold that this optimism is not justified. They have noted and watched cases which later on develop serious heart disease. Of course these patients are not more immune than are those with obviously healthy hearts, any more than adolescents with postural albuminuria are immune from the possibility of nephritis at a later period. But my own experience is that heart disease and kidney disease do not result from these conditions; and, while I cannot recall a case which supports the contrary contention, I can cite many cases which I have had the opportunity of following for years, and which point to the conclusion that there is no danger in allowing patients presenting these anomalies to undertake any forms of exercise they may be inclined to and can perform without producing distress which is either severe or enduring. The general health, and with it the heart's efficiency, suffers if such patients are restricted. If there is anything the matter which matters, it will soon reveal itself; and we shall do infinitely more good than harm by reassuring all such patients as to the soundness of their hearts and encouraging them to do what they incline and feel equal to and by discouraging them from dwelling upon their health.

The next case presents somewhat different features:

This is a boy I have watched for many years. His father had died suddenly from heart failure, and the element of heredity—an element which in these conditions is, in my opinion, quite negligible—had been impressed upon the mother, and had also, in conjunction with certain physiological peculiarities, caused various doctors and "specialists" to regard the child's heart as one requiring the utmost care and many restrictions. When I first knew him as a child of 7 or 8 he was a miserable specimen, and pining under the continual solicitous observation of his mother and a devoted nursery governess. I shortly sent him to a mixed day school for little children and he did well. Later he went as a day boy, and ultimately as a boarder, to a boys' preparatory school. I let him ride a bicyle and play the usual school games, and sanctioned his being entered for a public school, in spite of the fact that a systolic murmur was occasionally present, that the heart could be seen beating over a wide area, and that, though the impulse could not be felt lower than the fifth space, it was readily detectable opposite the nipple in the anterior axillary line—a condition which, with perhaps a sixth space apex beat, is not necessarily pathological. This child has gradually grown into a fine healthy specimen of boyhood. I had arrived at my conclusions somewhat cautiously, and had gradually trained the heart and general physique from a state of weakness to a normal state of strength. Sinus arrhythmia is now easily evoked, as was doubtless the case when first I saw him, though it was not noted at that time because I was then unaware of its significance, and did not—as I now do—look for it in any youthful case I am asked to examine. Two years ago, when he was 12½ years old, he went with his mother to Cornwall for the summer holidays. There he developed a cough, and his mother took him to a doctor, who, after carefully examining him, pronounced his lungs healthy, but said, "I suppose you know about his heart?" The mother had all her old fears revived, but told him that her own doctor at home had watched the boy carefully for years and pronounced his heart sound; had permitted games and bicycling, and sanctioned a public school. The Cornwall doctor said that, were he his own child, he would on no account permit any of these things. He prohibited all exercise for the time, but wisely advised the mother, when occasion offered, to seek Sir James Mackenzie's opinion. On her return home she came to me in a terrible state of agitation, and we shortly all went together to see Sir James, who, I am glad to say, confirmed my opinion in all respects. The boy has now been for two or three terms at a public school, and he comes to see me during each vacation. He is a bright, happy boy, healthy in mind and body, and joins in the studies and sports of the school without restriction, no more attention being paid to his health than to that of the other boys.

I could multiply these cases and cite similar ones in adults where a general test of cardiac response to effort will usually lead to a right conclusion, though we seldom, after 20 years of age, have the help that is given if long slow breaths produce their physiological and characteristic effect upon the pace of the heart-beat.

Of the cases hitherto recorded, the first was an example of negligible congenital defect and the rest were physiological anomalies. The following is a case of quite a different kind:

A young lady, aged about 20, had a sharp attack of influenza. It left her enfeebled and with a mitral systolic murmur. On getting about she panted a good deal on going up gentle inclines. But I let her walk in the garden and roads near by in preference to keeping her in bed. A little later on she and her sister went to Switzerland, and I was not surprised to hear that she was taking walks and enjoying them. But I was surprised, when they returned home, to find that they had become Alpine climbers and had been up the Jungfrau and the Schreckhorn. I found the heart normal and the murmur had disappeared. This occurred twelve years ago and the patient has kept well ever since.

The case is an example of what Mackenzie calls the poisoned heart—the heart affected by toxaemia, a thing that may happen during any systemic infection. Such patients get well much sooner under good hygienic conditions than if they are kept for long in bed, as they often are. The difficulty lies in excluding organic disease, which may occur under similar conditions, but which far more commonly develops during an attack of rheumatic fever than in other acute febrile infections. A rough murmur is more likely to be organic, while a soft one is more probably due to a slight dilatation which, provided the myocardium is intrinsically sound, is set right pretty quickly if the patient gets about and gradually increases exercise as it is comfortably tolerated. The condition corresponds to the temporary weakening of the skeletal muscles from similar causes. I can well remember in my own case, when convalescing from measles, that on first going out I was obliged to sit down after walking a couple of hundred yards. Within a week I could do a five-mile walk, taking the hills as they came. This rapid recovery of muscular tone would have been delayed had I remained longer in bed, and the same is true of the heart muscle, poisoned but not damaged during fever.

Systolic Murmurs Resulting from Endocarditis.

These are more serious because they are apt to be permanent, to become associated with other murmurs which are not systolic, to be accompanied by vegetations, and because both in pericarditis and endocarditis the myocardium is very likely to be invaded, and the heart muscle damaged, perhaps permanently. It is not always possible at first to say whether a murmur is due to dilatation or to endocarditis, and a poisoned heart may give rise to signs of muscle weakness similar to those of early inflammatory invasions. But severe cases are generally obvious and the slighter can usually be diagnosed as time goes on. Organic disease may be assumed as the rule when cardiac signs and symptoms develop in the course of rheumatic fever. And when organic disease is obvious, or suspected on adequate grounds, caution during convalescence is clearly indicated. Later on diastolic murmurs may develop, or the missed beats of partial heart-block may be noted in the cases which go badly. On the other hand, if recovery of myocardial tone takes place, gradual but cautiously graduated exercise may be permitted in spite of any murmurs which may remain. The muscle will not regain its maximum potential of health and energy unless it is given the chance, and in the later stages of convalescence, whatever be the damage remaining, exercise that is easily borne, and which increases the patient's sense of well-being, may be safely permitted.

Auricular Fibrillation.

The effect upon the pulse will naturally be watched, and any undue acceleration will inculcate caution; while, if exertion habitually produces a noticeable irregularity, we are probably confronted with auricular fibrillation. This must be distinguished from irregularity which becomes emphasized as the heart slows down after exercise, and which may be due to one of three causes: (1) Sinus irregularity, which we look for in the young and which is of excellent augury; (2) extra-systoles, easily detected, and, apart from other signs and symptoms, fairly negligible; and (3) (much more rarely) the minor phases of heart-block—a condition which should never be out of our minds when dealing with hearts damaged during the course of acute fevers, and especially acute rheumatism. Missed pulse beats are generally due to extra-systoles, and the cardiac sounds which accompany them are usually characteristic. Missed pulse beats synchronizing with

missed heart-beats suggest heart-block, though they *may* be due to extra-systoles too faint to be audible.

The most important point to recognize regarding systolic murmurs developed during febrile attacks is that the condition of the heart muscle is the all-important factor. In one of the most obviously and permanently damaged hearts that I have seen, following acute rheumatism, there never was any murmur at all, but there were (and still are, fifteen years later) obvious signs of cardiac embarrassment on any attempt at really active exercise. Had this lad shown a systolic murmur his symptoms might have been attributed to a valvular lesion, whereas the inefficiency exists without it, and is due to myocardial disease.

Such cases are, of course, not uncommon. I have recently seen an elderly lady whose early history I have been unable to unravel. She has general cyanosis, clubbed fingers, breathlessness on exertion, and oedema of both legs, and she has often been "doctored for her heart." But the pulse when I saw her was regular and not very fast, the heart not obviously enlarged, and the sounds quite normal. The exact diagnosis admits of more than one hypothesis, but that there are degenerative changes in the cardiac muscle is obvious, and the addition of a systolic murmur would not materially affect the prognosis, which is certainly grave.

It would be easy to quote many cases of such cardiac enfeeblement in which a systolic murmur was the only audible sign, but in these cases there is always evidence of weakened muscle and often of auricular fibrillation. In this condition—and it is one in which the outlook is always menacing—a systolic murmur is very often the only audible anomaly, and I think there can be no doubt that it is this association, in conjunction with the accompanying gamut of serious signs and symptoms resulting from inaction of the auricles, which has given rise to the long-standing impression that this is the natural ending to mitral incompetence, and has invested the mitral systolic murmur with its halo of sinister augury. The signs and symptoms have been attributed to "back pressure," and we all know the classic chain of events which is supposed to be gradually and surely forged. But the familiar clinical syndrome is often found without any murmur at all, and is in reality due to the impairment of the cardiac mechanism as a whole consequent on disease of the muscular wall and on the failure of the auricles to contract; and, if there is any "back pressure" at all, it is a minor factor, and proceeds, apart from extreme narrowing of the mitral orifice, equally and simultaneously from both sides of the heart. In many such cases there was once a double murmur, and mitral stenosis was the really important valve lesion; but as with the onset of fibrillation the presystolic murmur necessarily disappears, the serious results have been wont to be attributed to the regurgitation of which evidence still remains.

In all cases of obvious cardiac embarrassment a general survey must be made, and one point which can generally be settled at once is whether auricular fibrillation is present or not. The point is so important, and is as yet so commonly misunderstood, that a short review of its most obvious signs may not be out of place, seeing that it is often associated with a systolic murmur. The pulse, which may be moderate or fast, presents an "absolute irregularity"—generally recognizable by the finger, or by the heart sounds, and always by the sphygmograph—in which no two consecutive beats are quite the same in time or volume, and the irregularity is increased by effort. This is sufficient to establish the presence of the rhythm, but corroborative evidence is often found by noting that the pulsation in the jugulars is simple and not undulating, and that it corresponds exactly with the ventricular contractions, to which it is directly due.

So much for systolic murmurs accompanying serious heart disease. The murmur does not indicate the real trouble, which may be associated with fibrillation, or with heart-block, or be due to degenerative changes without abnormal rhythm. But the common association need in no way bias our judgement as to the unimportance of systolic murmurs in the very numerous cases in which they are heard in hearts which show no evidence of inefficiency or other signs of structural impairment; and in all such cases a systolic murmur may be safely and wisely disregarded.

Murmurs which are not Systolic.

Here we are confronted with a difference between the physiological and clinical terminology. Clinically the systolic phase commences with the beginning of the first sound and ends with the beginning of the second. It coincides with the systole of the ventricles, and murmurs occurring during this period are always called systolic. But while the physiological systole commences with the contraction of the auricles, the murmurs caused by the auricular systole are clinically termed "*pre*-systolic."

As all the murmurs occurring during the diastole of the ventricles have a graver significance than that which attaches to systolic murmurs proper, it is convenient to group them under a common heading; and, provided we keep the above considerations in view, we may welcome Mackenzie's suggestion that they be grouped under the generic designation "diastolic."

The Three Chief Varieties of Diastolic Murmurs.

1. *The aortic diastolic murmur*, easily detected, replacing the second sound, generally accompanied by Corrigan's pulse, and due to aortic regurgitation.
2. *A murmur occurring early in the pause*, due to aspiration of blood from the auricle to the ventricle, found as a late sign of mitral stenosis and occurring alone in many cases of auricular fibrillation, with stenosis.
3. *The crescendo presystolic murmur* characteristic of mitral stenosis, running up to the first sound, or alternatively to a systolic murmur (double mitral), due to the systole of the auricle in conjunction with a narrowed outlet, and naturally disappearing when the systolic action of the auricle ceases with the onset of fibrillation.

It will be noted that, while systolic murmurs are often due to negligible or transient causes, the diastolic murmurs all indicate serious and hampering disease. Of this I shall have more to say, but may here state that, while aortic incompetence gives rise at once to a diastolic murmur and always implies the necessity of restricting effort to well within the limits of tolerance, the case of mitral stenosis is somewhat different; this condition comes on gradually after an attack of endocarditis, and it may be months or years before evidence arises on which to base a diagnosis. It at first results in only a very slight narrowing, and, while the process may become arrested at any stage, it may proceed till the orifice is represented by little more than a slit. But if a presystolic murmur is heard, a guarded prognosis must be given, and it may be stated generally that patients showing any one of the diastolic murmurs should be discouraged from running risks, and should always be protected from the strain of occupations which imply the necessity of strenuous effort.

Prognosis.

In the early part of my paper I cited several cases from the point of view of prognosis—cases which, in my judgement, were of good augury. I have also referred to cases, only too familiar to us all, of far more serious portent. I will now speak of two more patients, illustrating many of the points I have already alluded to, and taking up their history in retrospect, for both are elderly ladies, spare of body, and active in temperament, and both about 70 years of age. They are neighbours, and each of them is known to have had a systolic mitral murmur for thirty or forty years, and it may be more. Their condition is, however, very different.

The first has never had any cardiac symptoms at all. I examined her the other day, and found a rough systolic murmur heard all over the heart, quite replacing the first sound. The mitral area appears to be the point of maximum intensity, and the murmur is audible in the axilla and all over both lungs at the back. The apex is in the sixth space. Barring an occasional extra-systole there is no irregularity. She can mount stairs and walk up hills, and is exceptionally active for her age. How or when the murmur started no one knows. It may be a congenital affair, or it may have originated in endocarditis. But though no doubt there is an organic lesion (mitral incompetence) the muscle is obviously sound and the effect of the regurgitation is negligible so far as the calls of ordinary life are concerned. She is a good example to quote in favour of Graham Steele's dictum, recently unearthed by Mackenzie, that no one dies from mitral regurgitation, though at her age, with the degenerative period of life well advanced, the future can hardly be regarded with equanimity.

Her neighbour's condition is far otherwise. Her heart trouble began during an attack of rheumatic fever. She has had many attacks of heart failure, and at her best is easily made breathless and has to pause on an ordinary flight of stairs. But by taking small doses of digitalis two or three times a

week and keeping within her limits, she gets along fairly well. She has a softish blowing systolic mitral murmur; her heart beat is diffuse, the left ventricle slightly enlarged, and her pulse, which is always slightly irregular, becomes markedly so after very moderate exertion. What is the condition of her heart? Clearly, like the other case, there is mitral regurgitation; but that is not the main thing. Her heart muscle was doubtless invaded when the trouble first developed, and now her auricles are not acting at all. They are in a state of permanent diastolic dilatation, and their musculature is in a constant state of ineffectual fibrillary contraction (auricular fibrillation). I suspect that she, at one time, had in addition a presystolic murmur, that there is narrowing as well as incompetence of the mitral valve, and that the case is really one of mitral stenosis, accompanied by myocardial invasion and secondary degeneration.

These two cases form a very instructive contrast, and suggest certain reflections on the effect of valvular lesions in general.

Why should it be that systolic murmurs are often negligible, and diastolic murmurs not so? I cannot say that I have seen any convincing explanation, though I have been convinced as to the facts. And yet it seems to me that a consideration of the lesions which give rise to the murmurs, and of the effects which are likely to result on the cardiac mechanism and on the heart's nutrition, do afford an explanation. I do not now speak of the grave cases in which a systolic murmur has been known to exist for years, which terminate in progressive heart failure, and in which a widely dilated mitral orifice is found *post mortem*. As in the case of the clinical association of fibrillation with a systolic murmur, so it is with these. We have got so accustomed to the assumption that the whole of the disorganized *post-mortem* findings are the end results of mitral regurgitation, that it is not easy to reshuffle the conditions in our minds, and realize that the main factor lies in disease or degeneration of the heart wall, and that mitral incompetence on a large scale is a result, and only in the later stages a contributory factor to the eventual catastrophe.

Nor need I dwell, at the other end of the series, on the physiological and functional murmurs — always, by the way, systolic — which are so common, especially in the young. They are often associated with febrile and debilitated conditions, and these of course need care and treatment; but, where found in conjunction with a good cardiac response to effort, they are negligible, and the only difficulty lies in distinguishing them from murmurs due to organic causes. Fortunately this difficulty, which is sometimes a very real one, is of comparatively little importance if it can be shown that organic systolic murmurs, existing alone, and unaccompanied by other evidence of cardiac disease, depend on lesions which are in themselves not serious.

On the right side a tricuspid systolic murmur is known to be often physiological, and that the regurgitation is generally inconsiderable is clearly shown by the small size of the ventricular wave in the jugular tracing. It is probable that a similar state of things is common also at the mitral valve, while even a more considerable back-wave is not very serious in an otherwise healthy heart. In the cycle of events the left auricle contracts, and throws its blood into the ventricle, and then immediately dilates and begins to fill again from the large veins, which are not only full of blood ready to pour into it, but must also be actively aspirated by the intrathoracic pressure being lower than the atmospheric. When the ventricle contracts the blood will be driven in the direction of least resistance — into the open aorta — and any that regurgitates through the mitral valve is met by the contents of the auricle already rapidly filling. Unless the mitral dilatation is considerable, very little will get through, and even if it is considerable, the counteracting forces are far from negligible. The period, too, during which regurgitation is possible is limited to the duration of the ventricular systole, and there is no interference with the blood supply to the heart itself through the coronary arteries. This is, perhaps, the main point, for — as has been shown by Starling[1] and others — the reserve power of the heart is enormous, and depends essentially on an unrestricted blood supply to the myocardium. Certain it is, as we have seen, that such cases may go on for years without any interference with the ordinary calls of life.

The small importance attaching to aortic systolic murmurs is perhaps even easier to explain. Some of them are probably functional, as at the pulmonary orifice; but, granted that a murmur is due to narrowing, it need have but little adverse effect. Stenosis is due to the adhesion of the margins of the cusps, and though a slight narrowing (extreme stenosis is very rare) may give rise to a loud murmur, it offers no serious barrier to the passage of the blood through the valve, and is easily compensated by a slight hypertrophy. If the process of adhesion continues, the margins of the cusps get shortened, and an aperture is left on closing, through which regurgitation takes place. So that, if there is much stenosis, we will also get incompetence, and we may be pretty sure that if there is no diastolic murmur the narrowing does not amount to very much; and further, unless there is incompetence, the circulation in the coronaries will not be interfered with.

I now turn to the diastolic murmurs, and hope to show that the lesions giving rise to them (mitral stenosis and aortic incompetence) produce effects which hamper the mechanical action of the heart, and also that interference with the circulation in the coronaries is, in both cases, a probable result. This latter factor is a most important one, for it must lead immediately to cardiac inefficiency and eventually to fatty or other degenerative changes. It is clear that any marked narrowing of the mitral opening must throw an extra strain on the auricle, which will hypertrophy to meet it; but if the narrowing proceeds and gets extreme, the auricular musculature at last gives way and fibrillation supervenes. But before this event, and apart from any inflammatory invasion of the myocardium, the nutrition of the heart wall is likely to have been impaired from inefficient blood supply. In stenosis that is more than very slight, the ventricle may fail to get adequately filled, the effect of which is seen in a general feebleness of the whole body, and, as the coronaries participate in the general failure of the circulation, the degenerative changes in the myocardium, which are the precursors of fibrillation, result.

In aortic regurgitation, the hampering effect on the machine is too evident to need dwelling upon. It is not, like mitral regurgitation, a process limited to the short period of the ventricular systole, but one which begins as soon as the systole terminates, and continues throughout the ventricular diastole, during the whole of which period the back-flow from the aorta into the ventricle, resulting from the systemic blood pressure in the aorta, is aided by the aspirating effect of the dilating ventricle. And further, as the force which normally fills the coronaries is derived from the high pressure in the aorta at the end of systole, and from the consequent back-kick which closes the aortic valves, it is obvious that in regurgitation there will be interference with this important function, and degenerative changes in the cardiac muscle are an almost certain consequence.

Having now reviewed the nature and significance of the commoner endocardial murmurs with which we are daily confronted, I come back to where I started, to remind you that our final judgement must always be based on a general consideration of each case as a whole, and in this estimate the presence or absence of definite signs of cardiac embarrassment, and a careful examination of the heart's response to effort, should always be given their due weight, and often a preponderating weight, in the formation of an opinion of the organ's capacity to meet the ordinary — and the extraordinary — strains of life.

The views I have expressed are those to which my own experience and reasoning have led me, and on which I have acted with increasing confidence for nearly thirty years. But I owe a debt of gratitude to Sir James Mackenzie both for personal encouragement and for his illuminating writings, which have both strengthened and clarified my opinions. Similar conclusions have been drawn by other workers, and it is satisfactory to find that the Medical Research Committee's "Report on soldiers returned as cases of D.A.H. or V.D.H."[2] after a very careful investigation, arrives at the view that systolic murmurs existing alone, and "without other disqualifying signs and symptoms," should be ignored. This has now come to be the modern teaching, and it has come to stay, though as yet many of the authorities have not accepted it, and the profession in general has hardly been able to divest itself of preconceived ideas. On the other hand, the subject is "in the air," and, as I stated early in my paper, the conclusion has been drawn by some that murmurs of all kinds may be discounted, and that consequently there is not much use in

spending time and trouble over them. Such is far from being the case, and the suggestion of the Medical Research Committee, that the issue, in estimating efficiency, is confused if the presence of a systolic murmur is noticed at all, does not appear to me to be a sound one. Every murmur is well worthy of attention, and those which can be classified as negligible should be noted as such. A knowledge of the nature and significance of the different types will lead to a reasoned conclusion as to how much weight should be attached to each. Diastolic murmurs have always a serious significance, and systolic murmurs are often associated with grave disease. But many systolic murmurs are negligible, and the general recognition of this truth will free a considerable section of the community from a needlessly restricted life, and from a cloud of unnecessary and haunting apprehension.

REFERENCES.

[1] The Linacre Lecture, 1915 (BRITISH MEDICAL JOURNAL, January 26th, 1918, p. 122). [2] 1917, pp. 8 and 32.

TRANSFUSION WITH PRESERVED RED BLOOD CELLS.

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THERE is a definite need in front area medical work of a method for giving transfusions rapidly. At casualty clearing stations during the busy time of an attack, it is obviously impossible to perform transfusions by the usual methods in nearly all the cases in which transfusion is indicated. The difficulty of procuring sufficient blood under rush conditions, the time consumed in carrying out the transfusions, and the need of every available medical officer in the operating theatre, all tend to reduce the number of transfusions which can be given. The use of preserved human blood cells for transfusion suggested itself as a possible solution of certain of these difficulties. A quantity of blood sufficient for a number of transfusions could be stored up beforehand and used as needed. The technique of transfusing such blood is simple and could be handled by one medical officer.

History of the Subject.

The experimental basis for this work was laid by Rous and Turner[1] working at the Rockefeller Institute for Medical Research. They found that blood taken into a solution of dextrose and sodium citrate and kept in the cold could be preserved for several weeks. Not only did the red blood cells thus treated remain intact, but they retained their viability for a long period. The preserving fluid used consisted of 5.4 per cent. dextrose combined with 3.8 per cent. sodium citrate; both of these solutions are isotonic with blood plasma. The optimum proportions of blood and dextrose citrate solution were found to be as follows: Three parts of blood, two parts of citrate, and five parts of dextrose solution. This mixture was placed in the ice chest and the red cells allowed to sediment. The supernatant fluid showed no signs of haemolysis even after the red cell layer had been stirred up repeatedly. Furthermore, after washing these cells in Locke's solution, there was no evidence of loss of integrity. It was found that the rabbit's blood preserved in this way could be kept intact for three to four weeks, and sheep's blood for as long a period as eight weeks. Human red blood cells showed no apparent deterioration at the end of four weeks. They determined the viability of preserved blood cells by means of transfusion of these cells in bulk. Rabbits were used for this purpose. A normal rabbit was bled a large quantity, up to half its blood volume, causing a marked drop in the haemoglobin percentage and red cell count. Immediately afterwards the rabbit was transfused with an amount of preserved rabbit's blood cells equal to the amount lost in bleeding. The haemoglobin returned promptly to its previous level. The animal showed no ill effects from the procedure, and the haemoglobin and red cell count remained normal. This demonstrated that the transfused preserved blood cells were behaving as normal red corpuscles. By this means it was found that rabbit's blood could be kept living for two weeks. Many similar experiments were carried out with the same result. Parallel tests were made with blood cells kept for longer periods. Rabbits were bled a large quantity as before and immediately transfused with preserved blood cells kept three weeks or more, but which still showed no signs of haemolysis. There was a prompt return of the haemoglobin to normal after the transfusion. This condition, however, was only temporary. The red cell count and haemoglobin soon began to fall, and by the end of the second day the transfused cells had practically disappeared from the circulation, leaving the rabbits markedly anaemic. The animals seemed normal otherwise—that is, there was no apparent harmful effect from the transfusion of intact preserved blood cells kept beyond the period of their viability. On the other hand, the transfusion of preserved blood cells that were beginning to show haemolysis had an extremely harmful effect, and the recipients died often within twenty-four hours. At the necropsy evidence of marked haemolysis was found.

An opportunity to test the usefulness of this method of transfusion with preserved human red blood cells was afforded me by the medical authorities of the Third Army, B.E.F., at whose casualty clearing stations the work was carried out.

METHODS.

1. PREPARATION OF THE PRESERVING SOLUTIONS.

The solutions of dextrose and sodium citrate are made up on the basis of 500 c.cm. of blood, as this is the usual amount taken from a donor. This requires in round numbers 350 c.cm. "isocitrate" (isotonic sodium citrate solution) and 850 c.cm. "isodextrose." These two solutions must be made up and must be autoclaved *separately*. *Freshly distilled water* should be used for all solutions.

For the preparation of "isodextrose" powdered dextrose is preferable, but since this substance is no longer obtainable in any quantity liquid glucose is used instead, and thus far has proved satisfactory; 2 grams of the liquid glucose is equivalent to 1.6 grams powdered dextrose. Thus, to make up 850 c.cm. of a 5.4 per cent. solution, 46 grams of powdered dextrose or 57.5 grams of liquid glucose is needed. On account of the difficulty in weighing out and dissolving liquid glucose, it is convenient to make up a large quantity of a 20 per cent. solution. This can be used as a stock from which the "isodextrose" may be prepared. Enough stock for six lots of "isodextrose" is made by dissolving 360 grams of liquid glucose in sufficient distilled water to bring the total volume of the solution to 1,800 c.cm. It is then filtered through coarse filter paper. If the solution is to be kept it should be sterilized. For making "isodextrose" 287 c.cm. of this concentrated solution is diluted with distilled water to 850 c.cm. in a clean two-litre bottle (Winchester). The bottle is stoppered with a cotton-wool plug, which is covered with gauze and tied on. The solution is sterilized in the autoclave for one half-hour at a temperature of 105° C. (equals 3 lb. steam pressure). This temperature should be reached slowly, as bottles of this size are liable to break if the change of temperature is rapid. For this purpose a one-burner Primus lamp is suitable. Care should be taken that the temperature does not exceed 105° C., as glucose may decompose if heated above this point.

There are no difficulties in preparing the 3.8 per cent. sodium citrate solution, but it is convenient to make up a 20 per cent. stock solution. A quantity sufficient for six lots of "isocitrate" is prepared by dissolving 90 grams sodium citrate in distilled water to a volume of 450 c.cm. and filtering. If this concentrated solution is to be kept it should be sterilized. For making "isocitrate," 66.5 c.cm. of the 20 per cent. solution is diluted to 350 c.cm. with distilled water. These 350 c.cm. amounts are sterilized in small bottles of the size used for transfusing the blood (described later). The same precaution is taken to cover the mouth of the bottle as in the case of the glucose solution; 105°–110° C. in the autoclave for one half-hour is sufficient.

2. PROCURING THE BLOOD.

(a) Donors.

Persons belonging to blood group IV[2] only are used. This saves the necessity of doing agglutination tests before transfusion, since blood cells of this group are not haemolyzed or agglutinated by the blood of any individual. The writer has not had the slightest difficulty in getting volunteers for donors. The importance of transfusion is explained to them beforehand and they are told that it is now possible to keep blood for some time and have it immediately available when needed. The donors are chosen from among patients with trivial wounds or those who have recovered from slight wounds. Persons giving a history of malaria, trench fever, or syphilis are excluded.

(b) Apparatus.

The apparatus for bleeding and the method of measuring are shown in Fig. 1.

The Winchester bottle containing the sterile isodextrose serves as the bleeding bottle. Before mixing the solutions

a mark is made on the bottle at the upper level of the dextrose solution, A; 350 c.cm. isocitrate is then poured in and another mark made at the new fluid level, B. The distance A–B measures 350 c.cm., which is roughly two-thirds of 500 c.cm. A third mark is made at C, a distance

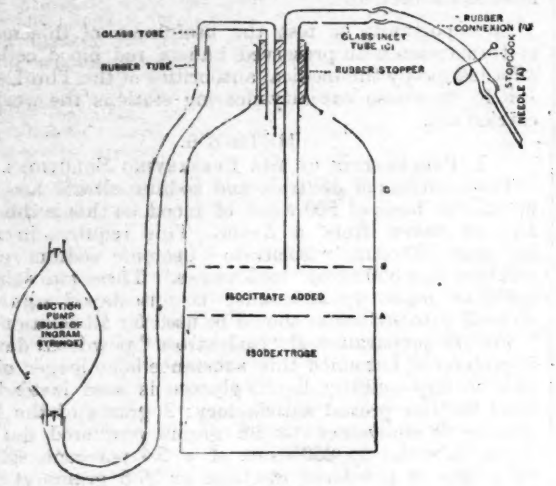

FIG. 1.

above B equalling one and a half times the distance A–B. This measures approximately 500 c.cm.

The chief points about the apparatus are these:

The needle (A) should be of a large bore—1.5 mm. diameter was found to work well—and not more than 1.5 in. long. It should have a fairly large olive-shaped base. The needle is the most important part of the apparatus, and requires careful attention. Before each bleeding it should be carefully sharpened. The most important consideration in the sharpening is to produce a good spear point. If the point is well protected when not in use by a metal barrel or piece of rubber tubing, sharpening will require only a moment or so. The needle must be kept scrupulously clean, and after each bleeding should be washed out at once, all fragments of fibrin or clot removed from the base, and small pieces of cotton-wool soaked in liquid paraffin thrust through the lumen with the stilette. The whole needle is well oiled before being put away.

The rubber connexion (B) should be flexible, and not more than 3 in. long. The inner surface should be smooth, and the lumen slightly smaller than that of the glass inlet tube (C). If the rubber connexion fits snugly over the base of the needle, tying it on is not necessary.

The glass inlet tube (C) is made of a large-bore glass tubing about 6 mm. internal diameter. It should extend below the level (B) of the solution in the bottle.

The glass tubing and the stopper are dry sterilized. The needle and attached rubber connexion are boiled for ten to fifteen minutes before use.

(c) *Procedure of Bleeding.*

The donor's arm is extended at a right angle to the body. The skin of the antecubital space is scrubbed with soap and water and the sterilization completed with alcohol. A tourniquet is applied to the arm high up and a suitable vein chosen, remembering that the needle is to be inserted towards the hand. It is very important to have as large a vein as possible. Opening and closing the fist and flicking the skin below the point chosen for venipuncture aids much in dilating the veins. At the point selected to puncture, a small amount of novocain is injected intracutaneously. The tourniquet is then released. The apparatus is assembled as shown in the diagram, great care being taken to keep all the open parts sterile. Sufficient pressure is made with the pump to fill the system with solution. When the air has been driven out of the needle, the stopcock on the connecting tube is closed. The pump-bulb is reversed so that suction can be made when needed. The apparatus is now ready for use.

The tourniquet is again tightened sufficiently to make the veins stand out well, but not enough to obliterate the pulse. The cuff of a blood pressure apparatus makes an excellent tourniquet with a pressure kept at 50–60 mm. A small nick is then made through the skin with the point of a scalpel. The bottle is placed on a stand close to the patient's arm in such a position that there will be no kinking of the rubber connexion when the needle is in the vein. Slight suction is next made in the bottle. The skin opening is mopped dry with a piece of sterile gauze and the needle inserted for a short distance beneath the skin before entering the vein. The stopcock is then opened and the needle is pushed into the vein immediately. The blood follows the column of solution down the tube without leaving an air space. A moderate degree of suction is maintained and the donor continues to open and close his hand slowly, care being taken that he does not move his arm. It is essential to keep the needle immobile. The operator should hold it throughout the bleeding, steadying his hand against the donor's arm. With these precautions 500 c.cm. of blood can be easily and quickly obtained.

If clotting occurs for any reason, such as the needle slipping out of the vein or air leakage, and the blood ceases to flow, the tourniquet should be released, the stopcock closed, the needle withdrawn from the vein, and another attempt made with a fresh apparatus (needle, rubber connexion, and glass tube) using the same receiving bottle. It is usually better to take another vein.

It is not necessary to agitate the bottle until after the bleeding. When the 500 c.cm. mark has been reached the tourniquet is removed, the stopcock closed, and the needle withdrawn. The bottle is then given a gentle rotary motion in order to mix the blood thoroughly with the preserving solution. After this the rubber stopper is removed and the original cotton plug, which has been kept sterile, is replaced. The blood is labelled with date, quantity, and name of donor, and placed in the ice-chest to sediment.

If the donor's veins are small and the needle method fails, the vein can be cut down upon and a cannula used. Inserting a cannula into a vein is more difficult and time-consuming than the needle method, and offers greater possibility for infection.

The glass tubing, rubber connexion, and needle are cleaned thoroughly immediately after the bleeding. The donor is kept on the table for fifteen to twenty minutes in order to avoid the feeling of faintness which may be caused by getting up at once. The withdrawal of this amount of blood—500 c.cm.—has no harmful effect.

In order to give transfusions of varying amounts it has been found convenient to procure quantities of 250 c.cm. of blood as well. For this purpose quart bottles are used in place of the Winchester, and contain half quantities of the glucose-citrate solutions. It is best to bleed 250 c.cm. from each arm, using a fresh suction apparatus for the second bleeding.

3. STORING THE BLOOD.

An ice-box is necessary for storing the blood. A suitable one can be improvised. The box, made of wood, should be double-walled with an air-space between. Two packing cases fitting one inside the other serve the purpose well. The space between the two boxes is filled with sawdust or some such non-conducting material. A tight-fitting door or lid is necessary. It is well to line the inside box with tin, and one end of this space should be fenced off to contain the ice.

This large bulk of blood, 500 c.cm., settles rather slowly. The supernatant fluid increases at the rate of 150 to 200 c.cm. a day. This is one real objection to the method, since it means that the blood is not available for immediate use. However, at the end of four to five days the blood will have settled to about 800 or 900 c.cm., and can then be used, as this amount of cell suspension does not contain any more sodium citrate than is given in an ordinary citrate transfusion. The additional fluid and sugar solution is an advantage rather than otherwise. Smaller quantities of blood, 300 and 400 c.cm., when taken into the same amount of preserving fluid that is used for 500 c.cm. of blood, settle more quickly, and could be used at the end of three or four days. If there is an indication that blood will be needed soon, 300 c.cm. amounts may be collected in place of the usual 500 c.cm., and the sediment of two or more bottles combined for a transfusion.

The supernatant fluid seen through the green thick-walled bottle has a slightly opaque bluish-white appearance. This opacity is due chiefly to blood platelets in suspension. Sometimes it has a yellowish or yellowish-green appearance if the blood plasma is highly coloured. Occasionally a scum of fat collects at the surface. This is of no significance. A pink tinting of the supernatant fluid

should be regarded with suspicion as it signifies haemolysis probably due to infection. Such a blood should be discarded. This has not occurred in the present work thus far, but has been seen experimentally. Cultures of the supernatant fluids have all been negative. Occasionally the supernatant fluid shows a pink tint during the first two or three days of sedimentation, which gradually disappears. This is not haemolysis. It is due to unequal settling of the red cells. A thin suspension of cells remains above the main bulk of the blood and sediments more slowly. Beginning disintegration of the red cells may occur at the end of the fourth week of keeping, and is marked by a pink colouring of the supernatant fluid just above the cell layer which soon increases in intensity and rises toward the surface. This blood, of course, should be thrown away as its use would be dangerous.

4. Transfusion of the Blood.

(a) *Preparation of the Blood for Transfusion.*

The supernatant fluid is drawn off by means of a siphon apparatus shown in Fig. 2. The glass tube and stopper are sterilized either by dry heat or boiling. The tube is placed in the bottle so that its lower end reaches almost to the blood layer. Suction by mouth is made at the end of the rubber tube, which need not be sterile. The only precaution necessary is that the liquid should be sucked up steadily and the suction released only when the column of fluid has reached the glass connexion (A), which is below the bottom of the bottle.

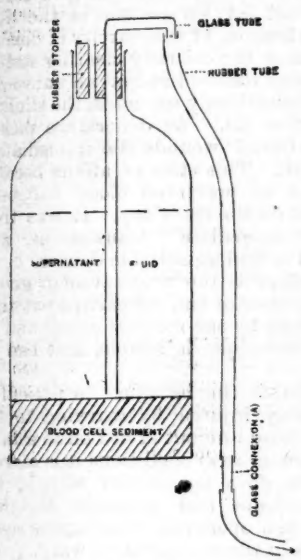

FIG. 2.

If the blood has been stored for some time the cells may have sedimented to a volume below that of the original amount of blood withdrawn. In this case a diluting fluid is added to bring the volume of a cell suspension at least to that of the original amount of blood. A 2.5 per cent. solution of gelatin in normal saline* was used for this purpose, on the theory that such a solution would remain in the circulation much longer than salt solution alone. Transfusions of large fluid bulk were found to be desirable, so that the total volume of each transfusion was always made up to 1,000 c.cm. with gelatin solution. The diluting may be done either in the original bottle or in the transfusion bottle, which should always have a mark at the 1,000 c.cm. level. However, blood cells should not be poured when they are in a sediment more concentrated than normal blood.

The blood cell suspension is then gently agitated by a rotary motion, and poured through two layers of sterile gauze into the transfusion bottle described below (Fig. 3). Filtering the blood is necessary because occasional small clumps may form during sedimentation. The gauze is tucked into the wide-mouthed bottle with a pair of sterile forceps. The bottle is tilted slightly so that the blood flows down the side instead of falling to the bottom, which might injure the blood cells. The bottle is restoppered and placed in a glass jar containing water at a temperature of 106° to 107° F. If the water is maintained at this temperature, and the bottle is occasionally agitated, the blood becomes warm in a few minutes.

* This is Hogan's solution slightly modified. It is most easily prepared as follows: 25 grams of purest quality gelatin (gold seal, finest quality) are dissolved in 200 c.cm. distilled water, to which is added 2 grams of NaCl. The mixture is boiled for fifteen to twenty minutes in a water bath to bring about complete solution of the gelatin. It is then filtered while hot through coarse filter paper (Chardin agar)—preferably in a hot filter—and autoclaved for one hour at 124° C. When desired for use, the gelatin is melted in warm water and poured into 800 c.cm. of sterile 0.9 per cent. NaCl solution to which has been added 0.2 per cent. sodium carbonate—Na_2CO_3 (10 H_2O). The water used for this solution should be freshly distilled.

(b) *Apparatus.*

The apparatus for transmission is shown in Fig. 3.

A wide-mouthed quart bottle is chosen for giving the blood, the stopper and neck of which should be protected before sterilization by a gauze covering. The needle employed has a bore about half the size of that used for bleeding. The length is not important. As shown in the illustration, the needle is attached to a short glass tube by means of a small piece of rubber tubing. The free end of the glass tube is thrust into the end of the long rubber tube (D) after the needle is in the vein. The rubber tube (D) may be of any convenient length. The glass tube (G) is bent so that the end projects into the lowest part of the bottle. In this way almost every drop of blood in the bottle may be given. The needle, with connexions (B) and (C) and the stopcock, are boiled up before use. The remainder of the apparatus is dry sterilized.

(c) *Procedure of Transfusion.*

The recipient's arm is prepared in a manner similar to that described for the donor, and a small amount of novocain injected into the site chosen for the vein puncture. The apparatus is assembled according to the diagram in Fig. 3. The bottle is kept in warm water during the entire process. It is well to tie the rubber stopper down to the bottle with two strips of adhesive plaster in order to prevent it from flying out when the pressure increases. After these preparations have been completed sufficient

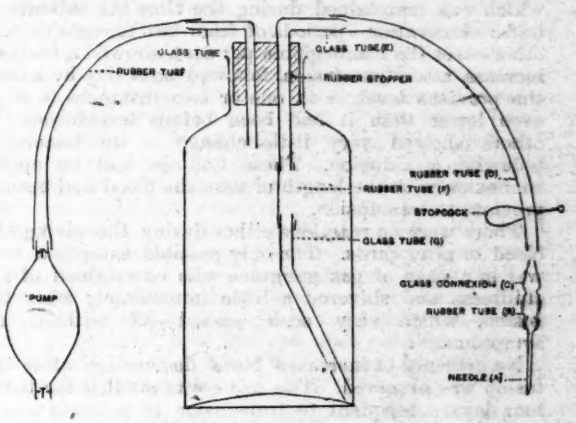

FIG. 3.

pressure is put on the pump to fill the apparatus with blood, and the stopcock is closed. The tourniquet is then tightened. As soon as the needle enters the vein blood flows out through the short glass tube, the tourniquet is immediately released, the apparatus is connected up, the stopcock opened, and the pump started. This technique is simple, and, if carried out carefully, there is no danger of forcing air into the vein. If the veins are collapsed or constricted, as is the case with certain patients in shock, it may be necessary to cut down on the vein and use a glass or silver cannula instead of the needle.

By using a needle it is scarcely possible to force the blood in too rapidly. With a cannula care must be taken to go slowly. Ten minutes should be the minimum time for the introduction of 500 c.cm. of blood. Care should also be taken to close the stopcock before the air bubbles begin to pass up the tube.

Results of Transfusion.

The blood used for transfusion had been kept varying periods of time up to twenty-six days. The majority of the transfusions were given with blood preserved from ten days to two weeks. The patients transfused included cases of haemorrhage, shock, and sepsis—chiefly the two former. An attempt was made to choose only those cases who would probably die without transfusion and yet who had a chance of recovery if given blood—that is, the only moderately serious and the apparently hopeless cases were excluded. (Indications governing the choice of cases for transfusion will be discussed in detail in a subsequent paper.) The amounts given in a single transfusion varied from 500 c.cm. to 1,000 c.cm., depending on the type of case. If the condition was one of

marked anaemia the blood sediments of two large bottles were combined. Where the anaemia was less severe a large bottle and a small one—750 c.cm.—were given. In cases judged to be chiefly shock 500 c.cm. amounts were used. The total fluid bulk of the transfusion, as before stated, was always made up to 1,000 c.cm. with gelatin solution.

The effect of transfusion with preserved blood was fully as striking as that observed after the giving of freshly drawn blood. There was the same marked improvement in colour, the pulse became slower and stronger, and the blood pressure showed an increase of 20 to 40 points. Furthermore, this improvement was maintained and increased. Patients transfused before operation stood the operation procedure well, and subsequent progress was quite as good as in those cases transfused by the usual methods.

Haemoglobin estimations* were made before and after transfusion, and in certain cases the red cells were counted as well. It was hoped that these determinations would give fairly accurate information as to the length of time the preserved blood cells remained in the circulation. The results of the tests, however, were inconclusive in many cases on account of the progressive fall in haemoglobin per cent. which occurs after acute blood loss and shock. Haemoglobin estimations after transfusion with fresh blood showed variations identical with those occurring after preserved blood cell transfusion. In some instances there was a rise of 5 per cent. to 20 per cent. afterwards, which was maintained during the time the patients were under observation—periods of from two to eight days. In other cases the haemoglobin per cent. showed a temporary increase after transfusion, followed next day by a drop to the previous level, or in one or two instances to a point even lower than it had been before transfusion. Still others showed very little change in the haemoglobin following transfusion. These findings had no apparent connexion with the length of time the blood had been kept previous to transfusion.

There were no reactions either during the giving of the blood or afterwards. The only possible exception to this was in a case of gas gangrene who complained of slight chilliness and shivered a little immediately after transfusion, which very soon passed off without other symptoms.

No evidence of increased blood destruction after transfusion was observed. The urine was studied for three to four days subsequent to transfusion in patients who had received blood kept nine to twelve days. Spectroscopic tests for haemoglobin and urobilin were negative except in two cases who developed gas gangrene two to three days after transfusion when a faint trace of urobilin appeared in the urine. Tests for bile made by the nitric acid method were negative. Unfortunately it was not possible under the conditions obtaining to test the urine of patients transfused with blood kept for longer periods than twelve days.

In all, twenty-two transfusions were given to twenty individuals. Of these, eleven were discharged to the base in good condition and nine died—a mortality of 45 per cent. Those patients who later died all showed the immediate stimulating effect of transfusion with one exception, a case of profound anaemia who died just after transfusion. Four died within forty-eight hours, of gas gangrene; and four lived from two to six days, dying ultimately from the same cause. Three of the four patients in this last mentioned group showed very marked improvement subsequent to transfusion; they stood operation well and were making satisfactory progress several days afterwards when gas infection appeared.

The length of time the blood had been kept appeared to have no influence on its beneficial effect. The improvement in those cases transfused with blood kept three weeks or more seemed to be just as marked as in those who received blood preserved for much shorter periods. It is probable that four weeks represents about the limit to which blood can be kept for transfusion, as the red cells usually begin to disintegrate soon after this. Judging by the experimental results quoted in the beginning of the paper, it will do no harm to inject blood cells kept beyond the period of their viability provided they are still intact, but much benefit cannot be expected from such a transfusion.

The criticism may be raised that blood deprived of its plasma cannot be as efficient a restorative as whole blood. In conditions of low blood pressure due to shock the plasma is probably a valuable part of the transfused blood. For this reason gelatin solution is added to the red cells in order to approximate more nearly the normal consistency of blood. However, in cases of simple exsanguination, the red blood cells alone are probably quite sufficient to restore the circulation to its normal condition. Abel, of Johns Hopkins, has shown this experimentally by removing large amounts of blood from dogs and replacing only the corpuscles suspended in Locke's solution. Bleedings were repeated in the same animal until all his plasma had been replaced by Locke's solution. The animal suffered no apparent ill effects from the procedure.

Advantages of Preserved Blood Cells for Transfusion.

The chief value of this method lies in the convenience of having a large quantity of blood on hand for a rush. Just before a recent attack the writer laid in a store of twenty pints of blood, which furnished sufficient material for fourteen transfusions. During the first two or three days of the fighting it would have been difficult to give transfusions in the usual way, not only on account of the time element involved, but also because of the scarcity of donors. This was due to the fact that the casualty clearing station at which this work was done received at first an unusually large proportion of the more seriously wounded, the slightly wounded being sent further on. As donors are picked from among those with trivial wounds the immediately available supply was small. This state of affairs became apparent when the stock of preserved blood had been exhausted, which occurred on the third day. It was then necessary to resort to "immediate" transfusions, and much time was consumed in finding suitable donors.

Another marked advantage is the time saved in giving the transfusions. The procedure can be carried out in a relatively short space of time by one medical officer and an orderly assistant. The technique is simple, and can be acquired easily.

The blood can be given at the bedside. A patient in shock may be considerably injured by carrying to the operating room or even lifting him out of bed on to a table near by. Furthermore, under rush conditions it is a great convenience to be able to do a transfusion without the necessity of having the donor and recipient together. Another consideration is the operating room space saved by giving the transfusions in the resuscitation ward.

It is possible by this method to give a large amount of blood in a single transfusion. This is particularly desirable in cases of severe anaemia. Very often it is not feasible under the conditions existing during an attack to give large "immediate" transfusions because of the fact that the withdrawal of amounts of blood greater than 600 c.cm., or at most 700 c.cm., from donors who are frequently suffering from varying degrees of exhaustion, may weaken them to an unjustifiable extent. In those cases of marked anaemia who were given preserved blood cells a single transfusion of 1,000 c.cm. was sufficient, while similar cases transfused with 500 to 600 c.cm. of fresh blood not infrequently needed a second transfusion.

Fluid may be added to the preserved blood cells before transfusions to any amount desired. In conditions where the circulation has been depleted, the introduction of a large quantity of a suitable fluid is indicated. Solutions of gelatin or gum acacia serve this purpose best. It was found that transfusions of large fluid bulk obviated the necessity which might otherwise arise of a subsequent injection of fluid or even of a second transfusion.

During periods of only moderate activity, when there is no need of a large store of blood, it has been found very convenient to keep a small quantity of preserved blood on hand for use at night. This has two advantages: One is the time saved; the other is avoidance of the difficulty which may arise in finding a suitable donor at night, as it is not always possible during busy times to keep a list of Group IV donors in reserve.

Transportation.

It has been found possible to transport preserved blood cells for a considerable distance. On several occasions

* Haemoglobin tests were made with a modified Sahli haemoglobinometer.

bottles of sedimented blood were carried in an ambulance for six or eight miles over rough roads without any damage to the cells. There was a slight stirring up of the surface of the sedimented layer, which coloured the supernatant fluid to a moderate degree. Judging by the colour, this contained perhaps 10 c.cm. of suspended blood cells, not more. Thus, if the blood had been used immediately after transportation, very little would have been lost in the siphonage. On standing, the blood cells soon settled, leaving a clear fluid above. It was considered possible that the red blood cells below the surface might have been injured during transit and the resulting haemolysis concealed in the deeper layers. Accordingly, the whole sediment was thoroughly stirred up, then allowed to sediment. As before, the supernatant fluid showed no sign of haemolysis.

SUMMARY.

As first found by Rous and Turner, it is possible to preserve living human red blood cells for several weeks in a solution of dextrose and citrate, when kept at ice-box temperature. This method of keeping blood has been made use of recently for giving transfusions at casualty clearing stations during a rush period. A quantity of blood was stored up beforehand ready for use when needed. The blood was kept for varying periods up to twenty-six days before transfusion. Twenty-two transfusions were given to twenty cases by this method. The majority of these were cases of haemorrhage. The results of preserved blood transfusion were quite as striking as those seen after transfusion with blood freshly drawn. There was the same marked improvement, the patients stood operation well, and subsequent progress was quite as good as in those cases transfused by the usual methods. The introduction of kept red blood cells had no apparent harmful effect, as there were no reactions or evidence of increased haemolysis after transfusion.

The chief advantage of this method over other methods of transfusion in current use is the great convenience of having a stock of blood on hand for busy times. The transfusions can be given relatively quickly, and the technique, which is simple and easily acquired, can be carried out entirely by one medical officer.

Experiments in the transportation of preserved blood have shown that it can be carried a considerable distance without injury.

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[1] Peyton Rous and J. R. Turner, *Journ. Exper. Med.*, 1916, xxiii, 219. [2] Major R. I. Lee, BRITISH MEDICAL JOURNAL, November 24th, 1917. O. H. Robertson, "Transfusion at Casualty Clearing Stations" (not yet published).

BLOOD TRANSFUSION IN A FIELD AMBULANCE.

BY

CAPTAIN NORMAN M. GUIOU, C.A.M.C.

THE work described in this article was undertaken as the result of lectures delivered by Major McNee and Captain Sladden, R.A.M.C., and Major Harrison, C.A.M.C., and is an endeavour to show that the operation of blood transfusion is *easily* applicable to the forward area, where it is most needed.

Group Testing.

As the mobile laboratory was busy preparing serums for casualty clearing stations, a few cubic centimetres of II and III serums were obtained from the Lister Institute. A group of dressers of different sections was assembled and shown the macroscopic test as used by Major McNee. A drop each of II and III serums are placed at opposite ends of a slide, and into these are stirred small quantities of blood picked up in the eye of the needle used for pricking the finger. After rocking gently, the slide is covered with a Record syringe box lid for four minutes, rocked again, allowed to stand another minute, and then read. After two demonstrations the dressers could do the test, and proceeded under supervision to test one another and their comrades. Stock serums were prepared from a clear-cut II and III by bleeding into a 2 oz. conical graduate, loosening the clot round the top one hour later with a probe, and next morning transferring the supernatant serum to boiled antitetanic serum bottles with an eye dropper and adding one drop of 5 per cent. carbolic for every ten drops of serum. These bottles, together with two eye droppers marked II and III and a safety-pin box of slides, fitted easily into an ordinary oblong cigarette box. On the inside of the lid the following table was pasted:

	Red Blood Cells.	Red Blood Cells.	Red Blood Cells.	Red Blood Cells.	Frequency of Group.
	1	2	3	4	Per cent.
Serum 1	—	—	—	—	8
Serum 2	+	—	+	—	40
Serum 3	+	+	—	—	10
Serum 4	+	+	+	—	42

+ = Agglutination. − = No agglutination.

The important point is the effect of the patient's plasma on the cells to be introduced.

This test case fitted readily into one of the spaces in the field medical pannier allotted to tubes of vaseline. With it a dresser could determine the blood group of a volunteer and a patient in a few minutes.

The Operation.

The syringe method with glass cannulae in the veins was used; needles were tried once, but the dresser assistant got his out of the vein and trouble resulted. Two inches of the thick-walled rubber tubing of the aspiration set were fitted to each cannula, one inch being free to receive the end of the syringe. Five per cent. carbolic was used for numbing and sterilizing the skin; the veins were dissected out and ligatures placed by the medical officer, and then he and the dresser together cut their respective veins and introduced the cannulae—that in the donor being directed distally. The cannulae were held in place and blocked by pinching the rubber tubing. The 20 c.cm. glass syringes, four in number, fitted snugly into the rubber connexions and were kept going in a cycle, being washed out each time in a vessel of boiled saline by a second dresser, and laid on a piece of sterile gauze ready for use. Plugging of the donor's cannula by the wall of the vein being drawn against its end may be overcome by stopping the suction on the syringe and sliding the cannula slightly in or out. The syringes and cannulae may be carried, sterile, in an old tablet tin (obtained from advanced dépôt medical stores) with the partitions removed.

Illustrative Cases.

CASE I.

Severe lacerated shell wound of the left thigh, and fracture of the femur, admitted to dressing station with tourniquet and Thomas splint applied. Intravenous injection of one pint 5 per cent. gum and 4 per cent. sodium bicarbonate* produced a slight improvement in the pulse. The blood was tested, and found to belong to Group IV. A robust infantryman, buried by shell, offered some blood, but turned out to belong to Group II, and had to be rejected. A slightly wounded corporal, Group IV, volunteered, and a pint of his blood was transfused without difficulty by the syringe method. Some improvement was noted, and the patient was warmed up and sent on. He died just before reaching the casualty clearing station. We have since thought that if this case had been given more blood, and allowed to warm up longer in the dressing station, he might have survived the long ambulance journey.

CASE II.

Shell wound of the thigh and fracture of the femur brought into dressing station with legs tied together and considerable blood in the stretcher; morphine gr. ¼ had already been given. A tourniquet was at once applied and 1 oz. 50 per cent. ether in liquid paraffin given between mouthfuls of port wine (Gwathmey's oral analgesia). He was allowed to warm up for fifteen minutes; meanwhile his blood was found to belong to Group II. A Thomas splint was then applied without pain, the wounds packed, the tourniquet removed, and one pint gum solution given intravenously; he was wrapped up and allowed to remain on a heated stretcher. In less than an hour he was found to be in shock—extremely pale with bloodless conjunctivae and lead-blue lips, barely conscious, but the radial pulse still faintly perceptible. A donor (Group IV) with a sprained ankle was found and 800 c.cm. blood transfused. After the operation the patient's neck and face were definitely red and his cheeks warm to the touch. His mental state improved immediately, and he raised his head and smiled and talked to the dressers. After drinking some tea and cafe-au-lait, resting meanwhile on a heated stretcher, he was sent on to a casualty clearing station surrounded with hot-water bottles, where he

* Since the publication of Professor Bayliss's article we have changed our gum formula to 6 per cent. gum and 0.9 per cent. sodium chloride.

arrived, according to the officer on duty, "recovered from his shock and in excellent condition." It seems probable that if this case had been transfused immediately he would never have developed the shock which, untreated, would undoubtedly have meant his death before he reached the casualty clearing station.

Conclusion.

Although there has been opportunity to carry out the operation on a very few cases as yet, there is no doubt that blood transfusion by the syringe method can be done easily in an A.D.S., and, in the writer's opinion, could be done in an average regimental aid post; and by its use some cases of severe primary haemorrhage which would in the natural course of events die in the forward area will live to reach the casualty clearing station.

Indebtedness is especially acknowledged to Captain Cowell and to the teaching of the —— Army R.A.M.C. school, as well as to Lieut.-Colonel T. J. F. Murphy, D.S.O., C.A.M.C., commanding the field ambulance.

AMOEBIC ABSCESS OF THE LIVER.

BY

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AMOEBIC abscesses of the liver are by no means uncommon in Mesopotamia, and are of interest for the manner in which the signs and symptoms frequently differ from those usually described in surgical textbooks. During the last twelve months over twenty cases have come under my observation in this hospital, besides many others already treated and passing through in various stages of convalescence during the course of evacuation from other hospitals.

As thousands of men have returned and will continue to return to England with active amoebae in the large intestine, I venture to record some of the principal features of the last twenty cases admitted to this hospital among British troops.

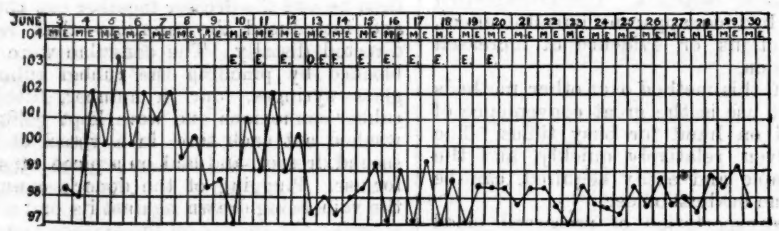

CHART I.—E, Emetine, gr. 1; O, operation. Quinine, gr. 30, was given on June 7th and June 8th. Blood film examined for malaria on June 6th, and blood culture for enteric group on June 12th; both gave negative results. The patient was sent to the base on June 30th.

Signs and Symptoms.

Patients usually give a history of former attacks of diarrhoea or actual passage of blood and mucus, and *Entamoeba histolytica* can usually be found in the stools. The onset of the disease is usually insidious, loss of appetite, malaise or wasting causing the patient to report sick. In a few cases, however, the disease runs an acute course and the onset is surprisingly rapid. In one case in which one abscess was opened and four more found *post mortem*, the patient was apparently well and doing full duty until eight days before the operation; as death occurred ten days later, the whole illness lasted only eighteen days. In another patient, who had been some days in hospital under observation, the temperature was not above 99° until three days prior to a large abscess being opened.

Pain may be a marked symptom, indicating that the abscess is near the surface of the liver, and is sometimes a useful guide to its position. Referred pain in the right shoulder suggests subdiaphragmatic irritation of the phrenic nerve, whereas pain in the epigastrium or loins may indicate an abscess in the lower part of the liver.

Vomiting occasionally occurs, but jaundice is rare; a slight icteric tint, with a trace of bile in the urine only, was noticed in one case.

With an abscess of large size or long duration, cachexia and signs of septic absorption—oscillating temperature, sweats, rigors, furred tongue, etc.—are well marked, but an interesting feature is that the pulse-rate is often relatively slow in proportion to the temperature. (The chart shows the temperature in a typical case.)

The cytological examination of the blood is of great importance; the leucocytosis and an increase in the percentage of polymorphonuclear cells so characteristic of pus are usually well marked. The most striking blood picture in this series of twenty cases was a total white cell count of 43,000 per cubic millimetre (with 89.8 per cent. polymorphs), and the least striking showed 12,500 white cells (74 per cent. polymorphs). There seem to be no other constant blood changes, and eosinophils are not usually present in greater numbers than normally.

The *x*-ray screen is useful in diagnosis in doubtful cases, or to afford confirmation where a liver abscess is suspected. Three points are of assistance: first, increase in the size of the liver in an upward direction; secondly, limitation of movement of the diaphragm, the normal 1 in. to 1½ in. being reduced to ½ in. or ¾ in. even on deep inspiration; and thirdly, the normal dome-shaped diaphragmatic convexity may be distorted by a bulging representing a pointing abscess.

Course.

There is some clinical evidence to show that small abscesses may be absorbed, and this is especially probable in cases where the resistance of the tissues to amoebic invasion has been increased by emetine injections.

The usual course in Mesopotamia seems to be rapidly progressive, and sometimes surprisingly so, and is well illustrated in one case in which the patient had never left England prior to his embarkation for Mesopotamia, so that the possibility of previous amoebic infection is very remote. He had been in Mesopotamia less than a month when he was admitted and an abscess containing nearly a pint of pus evacuated from the liver, amoebae being found in the pus in the course of a few days.

In most cases the abscess apparently increases steadily in size and may rupture through the diaphragm or into the peritoneal cavity; this being a comparatively slow process, it is well shut off by adhesions among the neighbouring organs.

In one case liver abscess was diagnosed, and it was decided to operate on the following day, but the patient suddenly collapsed and died in a few minutes. *Post mortem* it was found that two large abscesses were present, one of which had ruptured into the inferior vena cava, death occurring from the resultant haemorrhage.

Diagnosis.

In well marked cases the diagnosis presents little difficulty—the enlargement of the liver, signs of toxaemia, blood picture and *x*-ray screen, all pointing to the correct diagnosis. It may be difficult to distinguish between a right-sided empyema and a liver abscess. The latter, if situated in the upper right lobe, may cause compression of the lung, with dullness and feeble breath sounds as high up as the angle of the scapula; also some fluid in the pleural sac may accompany a liver abscess, as in one case admitted as pleural effusion in which the liver abscess was discovered subsequently. In these cases the final appeal may be to the exploring needle, the diagnosis resting on the site of the discovered pus.

The increase in the percentage of polymorphonuclear cells in the blood is of much assistance in distinguishing between simple and suppurative inflammation of the liver. A good illustration of the value of the differential cytological examination was that of a patient admitted with an enlarged and painful liver, slight fever, and diarrhoea. His total white cell count was 18,500 per c.mm., but of these only 60 per cent. were polymorphonuclear. A diagnosis of dysenteric hepatitis was made, and the condition cleared up with dieting and hypodermic injections of emetine.

In two cases where the abscess was in the lower part of the right lobe and situated near the mid-line, the

physical signs so much resembled those of an enlarged and infected gall bladder that the diagnosis of liver abscess was only confirmed on the operating table. A liver abscess in the posterior part of the right lobe may simulate a perinephritic abscess, especially as this latter condition is frequently seen in connexion with dysentery. An examination of the urine and signs of psoas irritation help to clear the diagnosis. Other cases of subdiaphragmatic suppuration—for example, those of gastric or intestinal origin—can usually be traced to their primary lesion.

Treatment.

The presence of pus is confirmed by the exploring needle; the exploration should always be conducted in the theatre, so that, if successful, the complete operation can be proceeded with. It is important to use a wide-bore needle, as the pus is usually thick and contains clots of lymph liable to block the needle. In one case in which the presence of pus was a moral certainty eight punctures were made before the abscess was discovered, and thick pus aspirated; probably the needle had on one or more occasions tapped the abscess, but the pus did not flow.

In this hospital it is the practice to leave the needle in the abscess cavity and excise a sufficiency of the ribs immediately below the needle. Well formed adhesions may be found between the parietal pleura and the diaphragm; it is, however, safer not to trust to them to protect the pleural cavity, but to insert a few points of suture between the parietal pleura and diaphragm. The diaphragm is then incised, and, using the needle as a guide, liver tissue is gently broken down until the abscess cavity is reached, when a drainage tube wrapped in gauze is inserted. The sinus usually heals readily, and in some cases syringing with weak quinine solution or eusol expedites closure. A course of emetine, 1 grain daily for twelve days, is usually given. I have seen cases in which the abscess was aspirated and a solution of quinine bihydrochloride (30 grains in 10 oz. of water) injected into the cavity; the patients apparently were convalescing satisfactorily, the evacuated pus doubtless being sterile. However, in one case which was drained in the usual manner the convalescence was retarded until a second abscess discharged itself into the existing sinus. This abscess was unsuspected.

When the abscess is in the lower part of the liver, or has already ruptured into the general peritoneal cavity, the abdomen is opened with the usual precautions for the protection of the peritoneum, and drainage carried out in the usual way.

Prognosis and Summary.

The prognosis of liver abscesses in Mesopotamia is unfavourable, the chief reason being that although one abscess may be satisfactorily drained others are present which may be undiscovered or undiagnosed. In one case in addition to one abscess drained, five others were found *post mortem;* live amoebae were found in the pus.

Another factor which increases the severity of the disease is the acuteness of the course and the consequent grave toxaemic symptoms. Coupled with this is the fact that the patient is often already debilitated from trying conditions in a climate which taxes the resources of the most robust, and consequently has little resistance to any infection.

I append a summary of twenty cases upon which these notes are based:

Apparently cured and patient evacuated* ...	8
One or more abscesses drained at operation, but further abscesses found *post mortem*	8
Abscess suspected, undiscovered on needling, found *post mortem* to be in the Spigelian lobe ...	1
Two abscesses, one of which ruptured into the inferior vena cava; death from haemorrhage ...	1
Death due to post-operative shock (no other abscesses)	1
Single abscess drained, but patient did not respond and died seventeen days later from asthenia	1
Apparently cured	7

Minimum mortality, 65 per cent.

* One of these cases subsequently died at another hospital from a second abscess.

It will thus be seen that liver abscess contributes substantially to the mortality and disablement among troops in this campaign, and during the last hot season in this hospital more cases of liver abscess found their way to the *post-mortem* room than cases of actual dysentery. Owing to the numbers of men who will return to England infected with *Entamoeba histolytica* there is every possibility that this disease will manifest itself among them. Practically every one who has been resident in Mesopotamia for a few months is a carrier of *E. histolytica*, besides many another protozoon, and until we know more about the amoebic group it is difficult to trace their connexion with suppurative processes.

We are told by Knowles and Cole[1] that the "different species" of amoebae "are all one and the same organism . . . *Entamoeba coli communis.*" Probably the *E. histolytica* is on the same pathological basis as the *B. coli*, and decreased resistance of the tissues or some stimulus applied to the organism causes it to become pathogenic, in which case the majority of the Mesopotamian Expeditionary Force are potential cases of liver abscess.

The most striking features of the condition as seen in Mesopotamia are the severity of the disease, often the acuteness of the onset and rapid course, and frequently the multiple nature of the abscess (in contradiction to the old name of "solitary abscess").

I am indebted to Lieut.-Colonel Davis, R.A.M.C., for permission to publish these notes, and to Captain J. Maitland Downie, R.A.M.C.(S.R.), for his assistance in collecting them.

REFERENCE.
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ACUTE INTESTINAL OBSTRUCTION BY TAPEWORMS (T. SAGINATA):

MECHANICAL BLOCKING OF ILEO-CAECAL VALVE, NECESSITATING LAPAROTOMY.

BY

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AND

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AMONGST the causes of intestinal obstruction due to the impaction of foreign bodies in the lumen of the bowel, accumulation of faeces, gall stones, intestinal calculi, and articles swallowed, such as teaspoons, are perhaps the best known.

The occurrence of intestinal worms causing acute obstruction is so infrequent in those countries where surgical textbooks are compiled, that authors as a rule do not even mention them as a possible cause. Nevertheless intestinal parasites are a very real source of danger in tropical countries, and they should be borne in mind as a possibility when exploratory operations are undertaken for acute intestinal obstruction.

Perret and Simon[1] summarize the histories of eleven cases of intestinal obstruction all due to *Ascaris lumbricoides*, all recorded since 1887. Most of these cases were diagnosed at the necropsy or during operation. They themselves record in the same paper another case. De Mello[2] and Masters[3] have each recorded one case of intestinal obstruction due to *Ascaris lumbricoides;* in none of the three last was laparotomy resorted to.

No doubt *Ascaris lumbricoides* is the principal offender amongst intestinal worms, but the following case proves that laparotomy may have to be done for acute intestinal obstruction due to tapeworms (*Taenia saginata*).

O. H., male, Sudanese, aged 40, working as a gardener in the Palace Gardens at Khartoum, was admitted into Khartoum Civil Hospital with a very much distended belly and total suppression of faeces and flatus for sixteen hours. The attack seemed to come on suddenly but without pain at 5 p.m. He vomited twice during the night and the belly became more and more distended.

On admission to hospital the following morning the belly was much distended and tense, and the coils of intestines were very evident; peristalsis was plainly seen, and considerable discomfort was experienced owing to the distension, but there was no obvious pain; the pulse was 84, full and regular. He could pass neither faeces nor flatus; rectal examination revealed only an empty rectum. Two or three enemata were given without

effect. Vomiting of intestinal contents occurred twice after admission, and exploratory operation was decided on.

Operation.

Chloroform was given, and a median incision from the xiphoid cartilage to the symphysis pubis was made. The small intestines were explored from duodenum to ileo-caecal valve; they were very much distended. The large intestines were collapsed from the caecum onwards. No cause for the obstruction being found, it was thought to be a "kink" or some equally unsatisfactory thing.

The small intestines were taken from above downwards and passed through the gloved hands, segment by segment, to squeeze onwards the flatus. This was not satisfactory and the imprisoned air was evacuated by puncturing the bowel wall in at least six places with a medium sized trocar and allowing the air to escape. When the small intestines were thus relieved and collapsed they were replaced inside the peritoneal cavity—the whole of the distended small intestines (ileum) having been lying in a towel outside the abdomen whilst the abdominal cavity was searched—the wound was sewn up in one of the usual ways and the patient sent back to bed with the distension altogether relieved.

After-History.

No flatus or faeces were passed on the day of the operation, and next morning the abdomen was a little distended again, but during the morning flatus was passed and he felt more comfortable; two enemata (turpentine) were given.

On the third day after the operation a long tube was passed by the rectum and a dose of 1½ oz. of castor oil administered by the mouth; a large mass of tapeworms was passed. The patient passed bits of tapeworms on several occasions during the next three days.

Owing to a little leakage from one of the trocar punctures in a coil situated in the pelvis an abscess formed. This was localized, however, and although it became infected with *B. coli* and was very foul, recovery was retarded not more than two or three weeks.

Undoubtedly the mass of tapeworms (there were probably four or five separate ones), which measured when freed from intestinal débris two or three pints, had become blocked against the ileo-caecal valve, causing mechanical obstruction; and if this had not been relieved by manipulation of the intestines and evacuating the flatus, the patient would probably have died.

The principal points about the case appear to be the following: Absence of pain even at onset, or afterwards, although the obstruction was acute. There was discomfort certainly due to over-distension. There was very little, if any, collapse. The pulse was fairly good and, sixteen hours after symptoms commenced, was only 84. There was, however, fairly frequent vomiting of intestinal contents (in the cases recorded of obstruction due to *Ascaris lumbricoides* the worm was frequently vomited), but absence of acute pain and very little collapse, together with acute obstruction symptoms, may be taken, we think, as a characteristic of obstruction due to intestinal parasites.

In the case here described there was no question of delaying the operation, such a course was contraindicated by the vomiting, distension and peristalsis and total suppression of flatus and faeces. The obstruction was complete.

The diagnosis of the cause of intestinal obstruction is such an important subject that we do not think any apology is necessary for recording this case. Operations for intestinal obstruction are amongst the most fatal in surgery. Statistics place the mortality at 60 to 70 per cent., doubtless due to the fact that most cases are operated on when too late; but it is also due to the fact that diagnosis remains so often uncertain until after the abdomen has been opened, and to the fact that, even if a correct diagnosis is established before the abdominal incision is made, the condition of the parts involved is a matter of speculation, and is usually worse than is apparent from the symptom. Cases occur—as, for example, that here reported—in which the distension of the intestines is relieved (and presumably the cause of the obstruction), the intestines replaced, and still it is impossible to say what has been the cause, and we have to fall back on an unsatisfactory speculation—such as a "kink," for want of better knowledge. Let us have in mind that a mass of intestinal parasites may, especially in tropical countries, be the cause of acute intestinal obstruction.

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Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

INTESTINAL OBSTRUCTION DUE TO DIAPHRAGMATIC HERNIA.

J. B. was admitted to hospital on March 17th, 1918, in a collapsed condition. He complained of severe abdominal pains, with vomiting, and gave a history of several previous attacks of a similar nature. The abdomen was slightly distended, but no rigidity was present, and no acute tenderness on palpation. When first examined there was some tenderness over the descending colon, and on a second examination, a little later, tenderness was located in the middle line, between the umbilicus and pubes. The temperature on admission was 95° F., and remained subnormal. The radial pulse was imperceptible. The heart was displaced to the right side, the left border being about half an inch to the left of the sternum; the sounds were feeble and the action rapid. Breathing was slightly laboured, but the respiratory sounds showed no sign of lung trouble. Over the lower half of the chest, on the left side, intestinal rumblings were heard mingling with breath sounds. The tongue was dry and slightly furred. The bowels had not moved for three days. A soap and water enema was given, but was returned, showing slight trace of blood and no faeces.

As pain still continued severe, morphine (2 grains) was given, and the general condition was treated by administration of brandy in small doses and hot-water bottles. No improvement resulted, though the pain was considerably eased. He got gradually weaker, and died on March 18th, 1918.

At the *post-mortem* examination the stomach was found to be greatly distended, extending to midway between the umbilicus and pubes. The caecum and large intestine were normal; the appendix was bound by adhesions to the caecum. There was at first sight no sign of small intestine in the abdominal cavity, but the ileo-caecal junction was found, and the ileum, when traced back, was found to disappear through the oesophageal opening of the diaphragm. Practically the whole of the small intestine was lying in the chest cavity on the left side, displacing the heart and left lung. Both the ascending and the descending portions of the loop of intestine passed through the oesophageal opening of the diaphragm along with the oesophagus. The stomach was full of faecal fluid under considerable tension. Two ulcers were found on the stomach wall, one near the pylorus and the other on the greater curvature. The part of the duodenum between the stomach and diaphragmatic opening was similarly distended and full of faecal fluid. The coils of intestine inside the chest cavity were slightly distended. The portion of ileum in the abdominal cavity was empty and contracted. The caecum and large intestine were normal and contained only a very small quantity of faeces. All the other organs in the abdomen were normal.

L. S. DICKIE.

Reviews.

TREATMENT OF VENEREAL DISEASES.

The Diagnosis and Treatment of Venereal Diseases in General Practice,[1] by Colonel L. W. HARRISON, D.S.O., R.A.M.C., is a book addressed by a specialist to general practitioners, and, in spite of some faults of arrangement, will be found remarkably complete in its discussion of syphilis, and highly practical in its directions for treating both that disease and gonorrhoea. Most readers will turn to the section in which Colonel Harrison summarizes his experience of the treatment of syphilis. He would at present choose one of the organic arsenical compounds, either salvarsan or one of its chemical equivalents—arsenobillon, kharsivan, or diarsenol—which are given intravenously, or one of the "neo" compounds given intramuscularly. He advises the simultaneous use of

[1] *The Diagnosis and Treatment of Venereal Diseases in General Practice.* By L. W. Harrison, D.S.O., Lieut.-Colonel R.A.M.C. London: H. Frowde, and Hodder and Stoughton. 1918. (Demy 8vo, pp. xvii + 482; 16 plates; 84 figures. 21s. net.)

mercury, and employs potassium iodide also in suitable cases. He gives full directions for the injection of the arsenical remedies, and in discussing their value observes that though undoubtedly many cases have apparently been cured by comparatively short courses of treatment, yet others have relapsed after most careful and repeated courses. With regard to the question whether the treatment will prevent the later nervous disorders, such as tabes and general paralysis, Colonel Harrison adopts a cautious attitude; he admits that the time has not yet come to pronounce judgement. For early primary cases he gives an arsenical compound weekly for three weeks, and then again on the fifth and sixth, and eighth and ninth weeks. He prefers the intramuscular injection of one of the neo compounds. One grain of mercury is given intramuscularly weekly for the first eight weeks. For modifications of treatment according to circumstances the book itself must be consulted. In early secondary cases he follows the same general plan, but after an interval of three or four weeks gives another course of three or four injections of a salvarsan compound at intervals of seven or ten days. If the Wassermann reaction be positive at the end of 100 to 110 days, he considers it advisable to repeat the whole course after an interval of about eight weeks. In later cases with active symptoms he advises a series of short courses of four injections each, with an interval of about eight weeks between the courses, and potassium iodide for two weeks in each interval. Before deciding to suspend treatment the cerebro-spinal fluid should be examined as well as the blood, and if anything pathological is found the treatment should be renewed after a suitable interval. Subsequently, during the first year the patient should be examined clinically at intervals of not more than a month and his blood tested at intervals of not more than three months. When treatment has been suspended for a year a small provocative injection of one of the arsenical compounds should be given and the blood serum tested on the second, fourth, seventh, thirteenth, and twenty-first days. When so many tests are not possible it is on the seventh day that provoked reaction is most likely to be caught. The cerebro-spinal fluid should also be examined a week after the provocative injection. In the second year a test every six months should suffice. We cannot follow Colonel Harrison in his discussion on the treatment of syphilis of the central nervous system, which is very detailed. He has short notes on galyl, luargol, and on mercurial preparations, and the methods of administration are fully described. Altogether the sections of the book dealing with syphilis are very complete. The sections on gonorrhoea are less full, but there is an excellent chapter on local treatment. It will have been gathered from what has been said that the book, while comprehensive in its treatment of the subject, is at the same time thoroughly practical in its discussion of details.

Dr. OTTO MAY'S small work on the *Prevention of Venereal Diseases*[2] is written mainly from the standpoint of preventive medicine, but with full recognition of the social and educational side of the campaign against these diseases. The keynote of the book is struck in this sentence: "The elimination of venereal diseases is a complex problem, incapable of solution by any single method." What the various measures are and how much the author expects from each are clearly set out in five short chapters and a summary. The first three chapters —on education and instruction, on treatment in relation to prevention, and on prostitution and venereal disease—bring these questions to a practical focus without raising controversial issues. The admirable work of the National Council for Combating Venereal Diseases is bringing home to the public the fact that science, ethics, and commonsense have reached a working agreement upon these matters. In the fourth chapter, as he gives due warning in the preface, Dr. May parts company with the National Council upon the vexed question of personal prevention or artificial prophylaxis, which was debated at some length in our columns a year or so ago, and has been brought to the notice of the educated public by the outspoken writings of Sir Bryan Donkin. From what has been said it will be clear that Dr. May does not belittle other means of checking the spread of venereal disease; but in this chapter and elsewhere he states the case, as strongly as it can be put but with fairness to those who hold the opposite view, for looking on "prophylaxis" as a legitimate and valuable ally in the campaign against these diseases; without its aid, he believes, the battle cannot be won. His argument should be read by all who wish to form an unbiassed opinion, because, although he holds strong views on one side, he is at pains not to misrepresent the position of others who with equal sincerity have come to a different conclusion. In contrasting the value of "early treatment" with that of the "prophylactic outfit" he recognizes that neither method is infallible: the former is often not early enough, and the latter is apt to break down in practice. But his contention is that both methods are decidedly useful; that there is no fundamental ethical difference between them; that both should therefore be encouraged; and that their provision ought not to be left to private enterprise.

Captain LUMB'S little book on the systematic treatment of gonorrhoea[3] is a useful handbook for those engaged in the treatment of this disease, whether at civil or military centres or in private practice. It is clear and concise, and its principles are sound. The chief feature of the author's scheme of treatment is a combination of gonococcal and staphylococcal vaccines, which is recommended both in acute and chronic gonorrhoea. Captain Lumb's original article on this subject appeared recently in this JOURNAL (October 6th, 1917).

BIPP.

PROFESSOR RUTHERFORD MORISON has put into a small volume[4] his considered opinion of the value of bipp—that is to say, a paste consisting of iodoform 16 oz., bismuth subnitrate 8 oz., and liquid paraffin 8 oz. or a sufficient quantity—in the treatment of wounds. A satisfactory paste, the author says, should leave a thin adherent even smear over the surface of the wound, and adds that many of the preparations sold do not fulfil this requirement. He gave an account of his methods in the JOURNAL of October 20th, 1917, so that we need not go though the recommendations of the book at length. We may note incidentally, however, the remarkable results obtained in the treatment of cerebral hernia. Professor Rutherford Morison's general conclusion is: "That if it is possible to get to the bottom of an infected wound so that it can be thoroughly cleansed mechanically, and suitable antiseptics be applied, the wound can be closed at once with interrupted sutures, always with impunity, and many times with the prospect of finding it healed when the dressing is removed for the first time at the end of three weeks." But he does not recommend the method for use at the front, for four reasons: the first is the danger of gas gangrene following closure of fresh wounds; the second is that the method must be carried out with such careful attention to detail as to take considerable time; the third is that both bismuth and iodoform may prevent satisfactory *x*-ray pictures; and the fourth that there may be more danger of poisonous absorption of bismuth or iodoform in fresh wounds than later on. The book is a convenient guide to a method which is undoubtedly of very considerable value. The appeal the author makes to surgeons to test it will have all the more force because he confesses in his preface that it took him a long time to realize the truth of what he saw, so opposed was it to all ordinary surgical canons. In conclusion we may quote his opening words: "War has taught surgeons once more the value of Lord Lister's work on the use of antiseptics in wound treatment, and now it has proved that with their aid primary union after suture of infected suppurating wounds is possible."

NOTES ON BOOKS.

The Medical Register for 1918[5] has just been published, and contains as usual the list of registered medical practitioners, including the colonial and foreign lists. The

[2] *The Prevention of Venereal Diseases.* By Otto May, M.A., M.D., M.R.C.P., late Honorary Secretary National Council for Combating Venereal Diseases. London: Henry Frowde, and Hodder and Stoughton. 1918. (Crown 8vo, pp. 240. Price 7s. 6d. net.)

[3] *The Systematic Treatment of Gonorrhoea.* By N. P. L. Lumb, temporary Captain R.A.M.C. London: H. K. Lewis. 1918. (Cr. 8vo, pp. viii + 120. 4s. 6d. net.)

[4] *Bipp Treatment of War Wounds.* By Rutherford Morison, Professor of Surgery, Durham University. London: Henry Frowde, and Hodder and Stoughton. 1918. (Fcap. 8vo, pp. 72. 2s. 6d.)

[5] *The Medical Register* for 1918. London: Published for the General Medical Council by Constable and Co. 1918. (Pp. 1280. 10s. 6d.)

total number of names is 43,819, giving a net increase of 338 over the total for the previous year. The number of names added by registration during 1917 was 1,134, being 68 less than in 1916, and 159 less than the average for the last five years. The number of names removed from the *Register* on intimation of death is given as 801, but, as the President pointed out at the last session of the General Medical Council, it is certain that the losses of the year are not yet fully known. *The Dentists' Register* for 1918[6] has also been issued. The total number of names is now 5,524, as compared with 5,512 in 1917. The number of dentists registered without licence or degree is now 1,274, or 23 per cent. of the whole.

[6] *The Dentists' Register* for 1918. London: Published for the General Medical Council by Constable and Co. 1918. (Pp. 167. 3s. 4d.)

NATIONAL COUNCIL FOR COMBATING VENEREAL DISEASES.

The third annual meeting of the National Council for Combating Venereal Diseases was held at Caxton Hall, Westminster, on June 17th. Lord Sydenham, who presided, said that the Council had fifty-four branches, including three in Scotland and one in Ulster. In the year ending May 31st, 1,323 lectures to civilians had been arranged by the branches, as well as 168 lectures by the central body in areas which the branches did not cover. A central council had been established in South Africa, and it was hoped that shortly Canada and every state in Australia would follow suit. In Bombay there was also an affiliated branch. The Council was in communication with the War Office on the difficult problem of demobilization, and was also doing all that it could in the matter of dealing with infected pregnant women and with mentally deficient persons who were contaminated.

Mr. Hayes Fisher, M.P., President of the Local Government Board, said that 135 local authorities in this country had now arranged for laboratories, and 136 had submitted schemes under the regulations, of which 127 had been approved. The hospitals which were actually treating these cases at the present time numbered 124, and all were provided with free supplies of salvarsan substitutes for the treatment of syphilis by qualified practitioners. The returns for 1917, the first full year of the system, were not yet complete, but, so far as they went, they showed that 22,000 cases had been dealt with in these hospitals, and that there had been 197,000 visits to the out-patient departments. Some areas were less active in this matter than others, but London and the Home Counties set a good example, as did some districts in the north, notably Durham. Mr. Hayes Fisher said that there was little chance of legislation this session, if, indeed, there was any during the lifetime of a war Parliament. But, short of legislation, more provision might be made in the way of lying-in hospitals for expectant mothers who had been infected; and another work which the local authorities, especially in industrial districts, might undertake was the establishment of hostels for shop assistants and domestic servants who had got into trouble. With regard to the Criminal Law Amendment Bill, he thought that Clause 5, which dealt with both sexes alike, might well be formed into a one-clause measure, which would have good hope of passage, and this would do away with Regulation 40 D, at which many took umbrage.

Mrs. Gotto, the general secretary of the Council, dealt with the question of notification, which, she said, was already on the statute books of Western Australia, New Zealand, and, in a limited sense, Canada, but apparently it was not very vigorously in effect in any of the dominions. In Western Australia there was a record of the results of the first fifteen weeks of working, which showed that only 135 and 153 men had been notified as suffering from syphilis and from gonorrhoea respectively, and only about 20 or 30 women in each of the categories. That showed that any effective notification must wait until the public themselves were convinced of its need. She thought it was urgent to educate the British public up to the point of notification in some form or other to be operable before demobilization.

Mr. E. B. Turner said that if a doctor, knowing that a patient suffering from venereal disease was about to be married, spoke of it to the other contracting party or to his or her parents or guardians, he laid himself open to an action for libel, and, what was an even greater deterrent, he violated the confidence of the consulting-room. It was of no use to alter the law of libel in this matter, as had been suggested, so long as the professional ethics in the case remained as they were. No doctor would violate confidence unless it was laid upon him as a statutory obligation to do so. If it was made necessary for the doctor under penalty to inform the other party to the contract he was sure that the medical profession would accept it, but they would not take such a course of action so long as it remained merely permissive. Mr. Turner also urged administrative action against quacks, one of whom, he said, was well known to be administering salvarsan in London at the present time.

The proceedings closed with a vote of thanks to Lord Sydenham, proposed by the Bishop of Southwark.

ROYAL MEDICAL BENEVOLENT FUND.

At the meetings of the Committee held on May 14th and June 11th thirty-five cases were considered, and £393 voted to the applicants. The following is a summary of some of the cases relieved:

Widow, aged 50, of M.R.C.S.Eng. who died in 1916. Unable to work owing to ill health. Has three children, aged 18 to 14, but none able to help. Income about £100 a year from friends and relations. Rent £36. Voted £10 in two instalments.

Widow, aged 50, of L.R.C.P.Edin. who died in 1891. Was left with three daughters and without means. Only permanent income now £20 a year from the Hospital for Incurables. Relieved nine times, £108. Voted £12 in twelve instalments.

Daughter, aged 62, of L.S.A.Lond. who died in 1874. Only income £25 a year from friends and about £5 from sewing. Pays 4s. 9d. a week rent. Relieved twelve times, £115.

Daughter, aged 48, of M.D.Dubl. who died in 1882. Has suffered for many years from arthritis, and is unable to work. Friends allow £40 a year, and she has £7 10s. from investments. Relieved three times, £12. Voted £5.

Widow, aged 62, of L.R.C.P. and S.Edin. who died in 1913. Endeavours to earn a living by taking boarders. Her son, who used to help, has joined the army, and applicant only receives 9s. 3d. allowance. Relieved once, £10. Voted £12.

Daughter, aged 70, of M.R.C.S.Eng. who died in 1890. Applicant unable to work. Income from other benevolent societies, and other sources, about £50. Has to pay £1 a week for board and lodging. Relieved nineteen times, £204. Voted £12 in twelve instalments.

Widow, aged 44, of L.R.C.P. and S.Irel. who died in 1903. Was left entirely without means, and before the war was able to earn her living by teaching languages. At present urgently in need of assistance. Relieved twice, £22. Voted £10.

Daughter, aged 63, of M.R.C.S.Eng. who died when applicant was a child. Owing to a serious accident in 1916 applicant can only get about with the aid of crutches, and is quite unable to work. Lives with relations who cannot afford to keep her. Relieved four times, £22. Voted £12 in twelve instalments.

Daughter, aged 54, of M.R.C.S.Eng. who died in 1894. Applicant, with two sisters, was left without means. In consequence of ill health not able to earn sufficient to keep themselves. One of the sisters receives help from the Fund. Relieved eight times, £118. Voted £12 in twelve instalments.

Widow, aged 44, of M.R.C.S.Eng. who practised in North Wales and died in 1910. Applicant is left without means, with two children, now aged 12 and 9. Lives rent free in return for services, and has occasional help from friends. Relieved six times, £60. Voted £10 in two instalments.

M.R.C.S.Eng., aged 75, married, who through increasing age and ill health is unable to work; owing to this and the high cost of living and illness of wife, applicant finds he cannot manage with his income of about £100 a year. Relieved once, £18. Voted £26 in twelve instalments.

Widow, aged 68, of M.R.C.S.Eng. who practised at Leighton Buzzard and died in 1904. She lost the whole of her income through fraudulent executors. A niece allows her 11s. a week, which is all she has. Relieved once, £12. Voted £12 in twelve instalments.

Subscriptions may be sent to the Acting Honorary Treasurer, Dr. Samuel West, at 11, Chandos Street, Cavendish Square, London, W.1.

The Royal Medical Benevolent Fund Guild is now called upon, as a result of the war, to deal with many widows and children who, in happier times, would not have thought of asking for assistance. It is glad to receive secondhand clothing and household linen. The class of clothes most wanted is that suitable for boys and girls working in offices, for women, and for old men. The gifts should be sent to the secretary of the Guild, 43, Bolsover Street, W.1.

British Medical Journal.

SATURDAY, JUNE 22ND, 1918.

MEDICAL PRACTITIONERS UNDER THE MILITARY SERVICE ACT.

IN recent issues we have endeavoured to place fully, clearly, and frankly before the profession the position brought about by the last Military Service Act. We have some evidence, however, that misapprehension still exists in some quarters, and this we are disposed to attribute to the flood of words through the eight-paged channel of the statement (M.N.S.R. 61) issued to members of the medical profession last week. There are few epigrams that stick so firmly in every man's memory as that which declares that language was given to us to conceal our thoughts; when a man finds that it takes eight pages of close print to state what the Act means and how the Ministry of National Service proposes to administer it, he begins to ask himself what trap is being hidden behind this cloud of four thousand words. We can confidently assert that the Ministry had no desire to conceal anything, but that it succumbed to the forensic cacoethes by which the younger ministries are so apt to be afflicted.

The Act itself is plain enough; it is a military conscription act. It makes every man born in Great Britain who was not more than 51 on the appointed date, April 18th, 1918, liable to military service, but for medical men it extends the liability to 56. In both cases the person concerned must be found physically fit on medical examination, and in both cases the Ministry of National Service may intimate to him that he can be more usefully employed for the good of the nation in carrying on his occupation in a civilian capacity. The Ministry has the power under the Act and Regulations to tell him where he can most usefully carry on his occupation during the currency of the Act, and if he refuses without good cause he may be drafted into the ranks of the army to serve in any capacity the army may think fit, and it is improbable that the recalcitrant conscript will be employed by the military authorities at his own work. When he receives notification from the Ministry of National Service that his case is under consideration, which cannot be until after he has been medically examined, the person affected may apply to the appropriate tribunal for a certificate of exemption on two grounds: He may apply on personal grounds—that he would suffer serious domestic or financial hardship, or that he is ill or infirm, or that he has a conscientious objection to undertaking combatant service. On the other hand, he may apply on the ground that it is expedient in the national interests that, instead of being employed in military service, he should go on doing the work he is doing. Or he may apply both on personal and occupational grounds. His right to apply for a certificate of exemption is indefeasible. If the application is made within the limit of time—fourteen days—after the notification is sent to him by the Director-General of National Service, the tribunal must hear his appeal, unless, with the assent of the Director-General, it decides to grant exemption in accordance with the application without hearing the case. At the hearing the applicant may call evidence, and he may have the assistance of a friend, and there is nothing to prevent this friend being a lawyer. This would open up an endless vista of hearings before the tribunals—in the case of medical men before the tribunals constituted by the Central Medical War Committee and the Scottish Medical Service Emergency Committee, or before the Committee of Reference—were it not that the medical tribunals have power on occupational grounds to grant only conditional certificates of exemption from military service. The condition attached to the certificate will be that the practitioner, if not required for medical service with the armed forces, "shall undertake such professional service, and under such conditions, as the Director-General of National Service may, after consultation with the Medical Tribunal and in concert with any Government Department concerned, from time to time deem best in the national interests."

The documents issued by the Ministry of National Service do not seem to carry us further than this. The actual procedure in the case of medical men in England and Wales has been set out in the circular letter addressed by the Central Medical War Committee to Local Medical War Committees. Full particulars were given last week (p. 674). The Committee will first ascertain the areas from which doctors should be spared, either for commissioned service with the forces or for substitution in civilian practice, if and when required. A notification will then be sent to medical men in the areas selected, who will previously have been examined medically by special National Service medical boards; the notification will be accompanied by an intimation that they may exercise their statutory right to apply for exemption; with the notification will go also a "certificate of protection" issued by the Director-General of National Service. This certificate appears to owe its name to the fact that it renders its possessor immune to the attentions of the recruiting officer. The certificates will be issued to medical practitioners by the Ministry of National Service area by area, and a general instruction has been given to recruiting officers not to call up medical practitioners for service pending the issue of the protection certificate. The phrases "protection certificate" and "protection" are defined generally in the recruiting code of the Ministry of National Service. These expressions are held to relate to "cases in which it is desired to secure for the time being the retention in civil life of men who are liable to and available for military service; and in order to secure this object administrative directions are given that such men are not for the time being to be called up for service. In order that the men concerned may be in a position to establish that they are rightfully continuing in civil life, certificates are issued by the authority of the Minister of National Service, recording the fact that the holder is not to be called up for service while the certificate remains in force."

The "certificate of protection," if accepted, will have the same effect as a certificate of so-called "standard exemption" granted by the medical tribunal. This standard exemption is conditional. It will hold good until the practitioner is offered a commission, but it is meanwhile subject to the condition that if required he will undertake such professional work as the Director-General of National Service, after consultation with

the medical tribunal, may offer him. Thus the hearing of an application on occupational grounds can result only in the issue of a certificate of exemption subject to the same condition as that attached to the "certificate of protection." Acting on information supplied by the Local Medical War Committee, the Central Committee will have ascertained the names of all medical men in an area who are available for commissions or for civil medical work other than in their own practices. From these practitioners the local committee will select those who they think can be most easily spared; but those so selected, if not satisfied with the recommendation of the local committee or the provisional decision of the central committee arrived at without a hearing, have the guarantee of the central professional committee to a hearing at which all relevant circumstances will be taken into consideration, as, for instance, personal difficulties, and any claim for retention at home as compared with the claims of other practitioners liable under the Act. The hearing in these circumstances will take place before the central professional committee acting as an advisory body to the Ministry and not as a statutory tribunal. A statutory hearing in accordance with the regulations can only be held should the practitioner refuse the "certificate of protection" and make formal application to the tribunal for exemption within fourteen days after receiving notice from the Ministry. The point for each practitioner to decide is whether he will gain any practical advantage by refusing the "certificate of protection" and making an application to the tribunal for exemption. As to his legal right to do so there can be no doubt.

It is hoped that the method of procedure worked out by the Central Medical War Committee, in consultation with the medical department of the Ministry of National Service, will result in providing, with the least amount of inconvenience to the profession, a reserve of doctors known to be available either for military or civilian work; this reserve will be drawn upon if and when required. But the Ministry of National Service has stated that the probability is that most of the practitioners made liable under the new Military Service Act will in fact never be required to do anything but their own professional work in their own locality, and that where substitution is necessary the arrangements would in the majority of cases be local only, and would not entail the removal of the substitute from his own practice.

Before dismissing the subject we are bound to add one observation, which is that the reason alleged for the special provision as to medical men contained in the last Military Service Act is primarily the needs of the military forces. We must assume that the Ministry of National Service has satisfied itself that the army cannot practise greater economy in its use of medical officers already serving. Much of the information which reaches us is to the effect that though certain economies have been practised there is still great room for more, especially at home. It is not possible for us to establish the truth of these views, partly because the mouths of witnesses are closed; but it is, we think, greatly to be regretted that the report of the special committee which went to France last September has not been published and that a similar committee was not appointed to investigate the position of affairs in this country. We believe that the War Office has itself instituted such an inquiry, but any action which may have been taken in consequence has not been made public.

THE PATHOLOGY OF EARLY CARDIAC BREATHLESSNESS.

In an article under this title we published in April, 1917, p. 459, an account of a report then recently published by the Medical Research Committee upon soldiers returned as suffering from disordered action of the heart (D.A.H.) or valvular disease of the heart (V.D.H.). These men are sent to hospital during training or on active service because they complain of breathlessness, fatigue, palpitation, precordial pain, and giddiness, or actual fainting, experienced for the most part during or after exertion. In order to avoid any implication not justified by the present state of knowledge, Dr. Thomas Lewis suggested the term "effort syndrome" for this group of symptoms arising under the condition mentioned. The group is to be found in a variety of pathological states—for example, in heart disease, in early phthisis, and in exophthalmic goitre—but it is also found, and with much greater frequency, among soldiers who present no physical signs of structural change of the heart tissue. The Medical Research Committee has now printed a supplementary report by Dr. Thomas Lewis, founded on a comparison of a number of patients of whom some had valvular affections and some had not, but all presenting the "effort syndrome." Persistent and incapacitating symptoms of cardiac disease, accompanied by valvular lesions, are usually recognized during the period of training, and the man is discharged from the army as permanently unfit. The cases of valvular disease considered in the report include, therefore, only minor degrees which have not incapacitated the men during training, or, at any rate for some time, under actual service conditions. Subject to the qualification indicated, it is said that, speaking generally, the physical disability in non-valvular cases is not appreciably less than the disability produced by the early phases of grave structural damage of the heart.

The etiological factors which underlie the symptoms comprising the "effort syndrome" are found to be similar whether the soldiers belong to the valvular or non-valvular group. In the earlier report stress was laid upon the frequency with which non-valvular cases gave a history of having suffered from infections of various kinds, and it was estimated that infectious disease played a chief part in promoting the condition in at least 50 to 60 per cent. of patients in whom the "effort syndrome" was not combined with clear signs of structural disease. In the new report comparison is made in this respect between three groups of men—101 cases of valvular disease of the heart, 558 non-valvular cases, and 100 cases of men invalided for gunshot wounds who did not present any symptoms of cardiac disorder. Any infection which had kept the subject in bed for more than two or three days was reckoned as an illness, and quinsy and repeated or severe tonsillitis were included. Any uncomplicated exanthema before the age of ten years was not reckoned. Among the 100 wounded men 82 had suffered from no serious illnesses; the 18 who had so suffered had had 32 illnesses among them. Amongst the 558 men belonging to the non-valvular group 459, or 82 per cent., had experienced serious illnesses, or such accidents as shell shock, gassing, and wounds. These men were returned to hospital for breathlessness, fatigue, palpitation, and so on, and often assigned the wound, gassing, or shock as a primary or aggravating cause of the symptoms. Amongst the 101 valvular cases 90 gave a past history of serious illness, and in 11 only was there no such history. The incidence of infectious disease and accidents, though higher in the valvular than the non-valvular

cases, was extremely high for both. The most notable difference was with respect to rheumatic fever. There was a history of rheumatic fever or chorea in 61 per cent. of the valvular cases, and in only 23 per cent. of the non-valvular cases. Among the wounded men taken for comparison only 4 per cent. gave a history of rheumatic fever or chorea. The evidence does not indicate that army life is chiefly responsible for the high incidence of a rheumatic history among the patients suffering from valvular disease. When the patients were subdivided into three groups—according as the symptoms first appeared before joining the service, during training, or on active service—the percentage incidence was found to be heaviest in the first group, and least in the last group. This distribution, it is considered, may be explained, in part at least, by the relative frequence of rheumatic causation among the young and by its relative infrequence as age advances.

In the earlier report it was stated that a history of venereal disease was rare among the valvular cases; it was obtained in only 2 per cent. It is concluded that venereal disease plays little or no part in the production of the "effort syndrome." It is not established that a history of venereal disease is much rarer in these men than in soldiers as a body; amongst the 100 men suffering from gunshot wounds a venereal history was obtained in five only, and in four only of 101 cases of grave valvular disease. While it is recognized that these figures may not represent the total incidence of venereal disease, since the man may wish to conceal the circumstance, it is believed that the incidence is comparatively small, and that the prevalence of syphilitic affections among the new armies has been exaggerated in many quarters. Among the aortic cases admitted during 1916, in which year the statistics were obtained, syphilis played but a small part, for precisely the same reason that rheumatic fever played a large part—namely, because of the youthfulness of the soldiers; but it is added that another and important reason is the morality of the men. Of the purely aortic cases, 29 were subjected to the complement fixation test; in 16 there was no rheumatic history, and the complement tests were all negative. Of the remaining 13, who all gave a rheumatic history, only one gave a positive complement test. A positive reaction was obtained in two of the 13 cases of aortic disease associated with mitral stenosis. Syphilis was suspected to be a causal agent in only four of the whole series of 50 aortic cases, and three of these four were over 40 years old, and in all three the symptoms dated to a period before joining the army.

Summarizing the effect of infection, it is said that in cases of valvular disease the onset, when marked by a special event, dated most frequently from rheumatic fever. Rheumatic fever also headed the list in non-valvular cases, although various other incidents taken together were a good deal more frequent. The symptoms came on gradually without special incident in 41 per cent. of the non-valvular, and in 52 per cent. of the valvular cases. With regard to the possible operation of gassing or shell shock as a cause, the facts are not conclusive; such incidents were given as a starting point in a small proportion of cases (2 to 3 per cent.), both among valvular and non-valvular cases. The most probable conclusion seems to be that the gassing or shell shock aggravated the effects of a lesion which previously did not produce symptoms, or symptoms so slight that they passed unheeded. The evidence as to the consumption of alcohol does not favour the view that it has anything to do with the production of the "effort syndrome"; so far as the figures go, they would rather point to the greater frequency of both non-valvular and valvular disease among teetotalers, but few of the men admitted consuming more than a moderate amount of alcohol. As to tobacco, both the non-valvular and the valvular cases smoked less than the men suffering from gunshot wounds taken for purposes of comparison. It is suggested that one reason for the smaller consumption in the medical groups is that the patient learns that tobacco has an injurious effect upon the symptoms. Many of the men smoked little because they found that more upset them.

The concluding part of Dr. Lewis's report raises questions of very wide import. He points out that the etiological factors underlying those symptoms which comprise the "effort syndrome" are similar, whether the soldiers belong to the valvular or non-valvular group. The chief difference in the clinical histories is the higher incidence of rheumatic fever in the first group. This fact and the high incidence of infectious disease in the histories of both groups is suggestive. It is pointed out that if patients in whom the heart is seriously damaged present symptoms which are not to be distinguished from the symptoms of other patients in whom there is every reason to believe the heart to be sound, and if the symptoms in both groups follow or are aggravated by similar events, then the symptoms in the former must not be ascribed to deficiencies in the circulation, and in the latter to some different cause. If the symptoms in valvular cases are assumed to be due to deficient circulation, are they due to the same cause in non-valvular? This question is answered in the negative, for it has not been possible to detect signs of circulatory embarrassment.

The question then arises whether in the valvular cases the symptoms have an origin other than improper distribution of the blood. Breathlessness on exertion, which is the cardinal symptom, can be discussed upon a chemical basis. In the non-valvular cases the breathlessness may be due not to imperfect circulation, but to altered chemistry of the blood—namely, to a "buffer-salt" deficiency. The theory of "buffer" salts is explained in a report to the Medical Research Committee published in the JOURNAL some time ago.[1] The blood is at all times receiving and parting with acid and alkali. These variations, if effected in an ordinary saline solution, would produce changes in relative acidity and alkalinity which would be physiologically intolerable. A given addition of carbonic acid to the blood only produces a quarter of the change in reaction which it would produce in a corresponding quantity of physiological saline solution. The reason is that the blood contains such substances as sodium bicarbonate, monacid and diacid sodium phosphates, and protein, which tend partly to fix the acid so that in a sense it loses its chemical freedom. The salts mentioned are therefore called "buffer" salts because they ease the shock to the reaction of the fluid caused by the addition of acid or alkali. In early mitral stenosis deficiency of the circulation has been assumed, but has never been proved to exist. There is no question that deficient oxygenation of the blood plays a part in the late stages of mitral stenosis, when there are signs of venous stasis, or obvious failure of the heart muscle, but this does not apply to those early cases of mitral stenosis which exhibit breathlessness on exertion. Mr. Barcroft has tested three such cases and

[1] Breathlessness in Soldiers Suffering from Irritable Heart. By Lewis, Barcroft, Cotton, Dufton, Milroy, and Parsons. BRITISH MEDICAL JOURNAL, 1916, vol. ii., p. 527.

finds a deficiency of buffer salts. The conclusion from this would be that an altered chemistry of the blood may be, and often is, responsible for breathlessness in early mitral stenosis, and that in such cases it is a sufficient explanation. If these observations are confirmed, the resemblance between the histories and symptoms of the two groups of cases will become less difficult to comprehend. They may be regarded as essentially similar, though in the one, as a result of a higher incidence of rheumatic fever, damage to the heart is the rule. In the non-valvular cases the condition may be regarded as uncomplicated, in the others as complicated by structural disease. Finally, it is said that there is no reason for a belief that the causes of the several conditions, other than those which are purely aggravatory—that is to say, those which lay bare the latent weaknesses—differ materially amongst civilian and military populations.

THE WORK OF NATIONAL SERVICE MEDICAL BOARDS.

THOSE, probably a decreasing number, who follow questions in the House of Commons will have observed the remarkable interest shown by a certain knot of members in the medical examination of the older men affected by the new Military Service Act. It has led to a number of attacks on the Ministry of National Service which have taken the form of attempts to blacken the character of the members of the National Service Medical Boards now set up all over the country. Normally such a board consists of a chairman and four medical practitioners engaged in general or consulting practice in the locality. In a time of pressure such as the present it has often been necessary to reduce the number to three. The duty of the medical boards is to put each man in one of four grades; its decision is based solely upon medical considerations. The decision as to the indispensability or otherwise of men in different classes of the community for different classes of work is a matter for the tribunals. These bodies have pressed for a more detailed medical grading of men, for if the grades were multiplied it would in many cases be easier for the tribunals to determine whether a man of a certain grade was more necessary for civilian than for military duties. It was, however, clear that such multiple grading could not be made on medical grounds solely; it would necessarily be complicated with the problem of the man's fitness or indispensability for civilian or military work, as the case might be—a matter for the tribunals themselves. The matter of the grading of men of older years was carefully considered by the Medical Department of the Ministry of National Service before the new Act came into force. Two courses were open to it, either to devise a new system of grading for the men of older years, or to apply the system already in use to them. The reasons which were felt to militate against the first alternative were that it would not be easy to decide at what age any system of older grading should commence, for to establish the lower limit at the age of 43 would have afforded no firm foundation either on medical reasons or on grounds of efficiency for military or civilian work. The ages between 43 and 51, or in the case of medical practitioners 56 years, could not be made equivalent to any age periods related to military efficiency on the one hand, or to physical life changes on the other. Again, it was realized that it would be extremely difficult to work out conditions to determine grading for the older men which could be dealt with on lines parallel with those determining the grading of younger men. The Medical Department of the Ministry consulted the medical authorities who had previously assisted in drawing up the system of grading, and the opinion was expressed clearly and firmly that it would not be possible to establish different systems of grading for men of different ages, as no scientific or medical basis could be found. Medical boards were accordingly instructed to place the older men in Grade I if they possessed the full normal physical fitness to be expected of their age. Those who varied from this normal standard in certain particulars were to be placed in Grades II or III, while those totally or permanently unfit for any form of service would be placed in Grade IV. Among the older men are some fit for certain classes of military work, and the army has given an undertaking that they shall be trained and employed according to the ability and efficiency to be expected of their years. The task which the Medical Department of the Ministry of National Service has had to undertake was quite novel in the history of this country. Continental military powers had already their older armies—Landwehr and Landsturm—established out of their younger army. The work now imposed upon the medical boards of selecting from the older men of the country those suitable to form the various classes of the new older army is of a most responsible character. A large proportion of civilian medical practitioners are giving their services to the country for this work on the invitation of the Government, and the patriotic purpose underlying their effort should be understood and recognized. They should be immune from captious criticism, and such incidents as that provoked by Sir Frederick Banbury on Tuesday ought not to be allowed to waste the time of the House of Commons and the time of officials, which is, perhaps, of more value. The story Sir Frederick Banbury had to tell is set out with sufficient detail in our Parliamentary Notes. Sir Frederick Banbury relied upon an *ex parte* statement, which gave an altogether erroneous impression of what actually happened. The gentleman of whom the story is told was a haemophiliac, and produced a certificate from his ordinary medical attendant to this effect. Evidence of the existence of the condition indicated in the certificate was at once recognized and the gentleman was within a few minutes placed in Grade III, which includes those who, presenting physical disabilities which unfit them to undergo military training, may be called upon to perform duty in military establishments under conditions approximating to their home life and surroundings. The letter Sir Frederick Banbury read out to the House of Commons contained a paragraph to the effect that the medical board disbelieved the statement that the gentleman was a haemophiliac, and made him get into a bath to try and bend his knees by swimming. After reading this out Sir Frederick Banbury said: "I do not think I have ever made a statement [to the House] that I have not verified, or perhaps only in one instance." We are afraid that the member for the City of London will have to add one more. The examination, it is true, was made at the Camberwell Baths, but the bath was boarded over a year or two ago and forms a large hall, which has since been in use for the medical examination of recruits. This gives a measure of the care taken to verify statements made to the House of Commons—*ex pede Herculem*.

INTER-ALLIED SCIENTIFIC FOOD COMMISSION.

LAST week we gave some account of the work of the Inter-Allied Scientific Food Commission, and mentioned that it was holding its third meeting in London. This meeting, which has now been brought to a close, was chiefly concerned in examining the figures which would render it possible to determine the calorie value of the home production of each of the allied countries, and then, by comparing the figure thus obtained with the needs in calories of the population in each country, to determine the amount of imports necessary for the maintenance of the population, or the exportable surplus, as the case might be. The Commission completed this task during the London meeting, and its results, which will shortly be presented to the allied Governments, will serve

as a basis for the action to be taken by the different inter-allied executives in allocating to each country its proper proportion of the supplies of food which will be available for export from the American continent and from such other parts of the world as shipping facilities may allow. The Commission has thus performed for all the allied countries a work somewhat similar to that carried out by the Food (War) Committee of the Royal Society for the United Kingdom. For the first time it will be possible for the inter-allied pooling of resources and supplies to be carried out equitably in accordance with the impartial decisions of science.

SODIUM CYANIDE A RESPIRATORY STIMULANT.

THOUGH praised as a respiratory stimulant ninety years ago by Michael Ryan, hydrocyanic acid has long lost any reputation in this respect, but the experimental and clinical results obtained by Loevenhart, Lorenz, Martin, and Malone[1] from the intravenous injection of pure sodium cyanide, which has the same action as the acid, show that its use should be revived. A freshly prepared solution of pure sodium cyanide in sterile physiological salt solution was given intravenously to dogs with respiratory depression due to morphine, chloroform, and ether narcosis, and especially in artificially increased intracranial pressure; sixty-two experiments were carried out in connexion with the last condition. The sodium cyanide was preferred to the potassium salt on account of the depressing effect of the latter on the heart. In increased intracranial pressure, such as occurs in man from tumour, haemorrhage, and fracture of the base, sodium cyanide is the most powerful respiratory stimulant known. After a single injection there is a latent period of a few seconds, and then the respiration is stimulated for ten to fifteen seconds. A slow continuous intravenous injection will ensure a continuous stimulation of respiration. After animal experiments had shown the safe limits of intravenous injection, ten cases were treated by injection of a fiftieth normal sodium cyanide solution (0.1 per cent.) into the median basilic vein with a 20 c.cm. Record syringe. The cases selected were examples of increased intracranial pressure from any cause with respiratory depression, and the injections were given not instead of a decompression, but pending operation; in respiratory failure due to chloroform or ether, and in bed-ridden cases of advanced paresis with developing hypostatic pneumonia the drug proved in every instance a reliable stimulant, and the results in animals were fully confirmed. After a latent period of twenty seconds respiration was stimulated by a single injection for a period rarely exceeding thirty seconds. Slow continuous injections are more conveniently given by means of a burette, the fluid being run in at a rate of 1 c.cm. in fifteen to thirty seconds; one patient received over 100 c.cm. in sixty-four minutes. The cyanide is apparently transformed rapidly in the body into a non-toxic product, but the injection should be slowed or temporarily stopped on the appearance of any untoward symptoms such as well-marked pallor, nausea, much increase in pulse-rate, or depression of respiration from too rapid injection or from an excessive amount. As a matter of fact, no bad symptoms were observed in any of the patients, and many of them were obviously benefited. The method is suggested also for resuscitation from drowning, but no case was available for trial.

[1] A. S. Loevenhart, W. F. Lorenz, H. G. Martin, and J. Y. Malone, *Arch. Int. Med.*, Chicago, 1918, xxi, 109-129.

ANTIVIVISECTIONISTS AND THE RED CROSS.

WHILE crediting the opponents of animal experimentation with honesty of purpose, it can scarcely be denied that the effect of this good quality is neutralized by an obliquity of moral vision which makes them in the literal sense *hostes humani generis*. While the philozoist loves animals by nature, he suffers his fellow man, as Miss Frances Power Cobbe said of herself, only by grace. His fanaticism leads him much farther, for he is willing to sacrifice the welfare of mankind to the comfort of certain animals. A particularly shocking example of this perversity of mind has recently been seen in America, where, owing to the action of antivivisectionists, the Red Cross was induced to revoke its decision to appropriate money for animal research work in the interest of sick and wounded soldiers. Advice plainly intended to discourage enlistment and efforts made to safeguard the health of the troops was widely disseminated. The impudent statement was made that, "although it (vivisection) has been practised for many years, nothing has been discovered by means of it that is at all beneficial to the human race." In face of what has been accomplished in the present war for the treatment and prevention of wound infection, tetanus, gas gangrene, trench fever, shell shock, and other conditions, we can only wonder at the mental blindness which prejudice can produce in otherwise intelligent persons. We have credited antivivisectionists in general with honesty of purpose, as we believe that their opposition to medical research is due to ignorance. But it is difficult to acquit some of their leaders of deliberate bad faith when we read certain statements made in a pamphlet entitled "Why is my Soldier Sick?" issued by the National Antivivisection Federation of New York, and forwarded to the United States Secretary of State for War. In protesting against the compulsory inoculation of soldiers, it is asserted that Great Britain had been forced to rescind the enactment of compulsion after the alarming effects of inoculation were disclosed. Professor W. W. Keen of Philadelphia, *clarum et venerabile nomen* of American surgery, who, though over 80, is serving as a major in the Medical Reserve Corps, has come forward, not for the first time, as a champion of experimental research, the beneficial effects of which he has seen in his long career, extending from the Civil War to the present day. He refutes the allegation that this country was obliged to rescind compulsion by showing that it has never existed. Antityphoid inoculation has never been compulsory in the British army. Nevertheless, in spite of the persistent misrepresentation of antivivisectionists, 99 per cent. of our troops have voluntarily submitted to vaccination against typhoid fever. In an article published in *Science* of February 22nd, 1918, Dr. Keen showed by a mass of facts, which must carry conviction to every unbiassed mind, how great is the measure of protection against typhoid afforded by inoculation in the American and British armies, and the immense progress in the art of healing which has been the outcome of animal experimentation. On the other hand, the antivivisectionists have done nothing whatever for the benefit of man or even of animals.

FOOD, HOUSING, AND TUBERCULOSIS IN GERMANY.

THE Prussian Food Department issued an order on November 9th, 1917, permitting a considerable increase of the food ration for the subjects of pulmonary disease, both in institutions and at home. The order states that for some months the 1913 mortality from tuberculosis has been exceeded by 50 per cent. This is attributed to lack of food, particularly in the case of patients living at home. Special efforts are therefore to be made to bring the ration for these patients up to that obtainable in institutions for the tuberculous. The revised weekly ration is: Potatoes, 5 kilos; meat, 500 grams; bread, 2 kilos; butter, at least 250 grams; and 4 eggs. To this is to be added a monthly ration of 400 grams of cheese, 2,000 grams of cereals and leguminous foods, and 1,000 grams of marmalade, artificial honey, etc., together with 1 litre of milk a day. These are minimum quantities. There is no reference in the scheme to sugar as such. The need for giving the tuberculous sufficient food is considered so urgent that, failing other means, the ration for the tuberculous is to be brought up to the desired

level at the cost of the healthy in the same district. The *Allgemeine Ortskrankenkasse* of Berlin has investigated the housing conditions of 9,933 of its sick members. Over 1,300 lived in rooms with a floor surface of less than 10 square metres, and 25 per cent. of them shared these rooms with one or more other persons. The cubic capacity was in the case of 3,400 persons under 20 cubic metres a head and in that of 268 persons under 10. Of the 3,542 patients with lung disease only 715 had bedrooms to themselves; 21.46 per cent. of the men and 28.94 per cent. of the women had relatives who had died of, or were suffering from, pulmonary tuberculosis. Of the 2,830 married women suffering from pulmonary tuberculosis 94 had lost their husbands from tuberculosis, and of the 946 married men 7 had lost their wives from this disease.

MILITARY HEART HOSPITALS.

WE refer elsewhere to a report by Dr. Thomas Lewis setting out some of the conclusions which have been reached as the result of the intensive study of heart disorders occurring among soldiers at the central heart hospital, established first at Hampstead, but afterwards removed to Colchester. Active steps are now being taken to extend this organized work to all the other Commands, and the intention is to establish a hospital on the same lines as that now at Colchester in each. The results reached at the inquiry instituted at the instance of the Medical Research Committee, so far as it has yet gone, are of the utmost importance, not only at the present time in their military relations, but also as a permanent contribution to cardiac pathology generally. We have often had occasion to admire the readiness with which American medical men, both before their country entered into the war and, naturally, with even greater eagerness since, have taken advantage of every opportunity to make themselves acquainted with what has been done by their European allies. Such opportunities have, of course, been readily afforded, and this matter of heart disorders in soldiers is no exception. The American military authorities hav been for some time systematically sending men to work in the hospitals directed by Dr. Lewis, with a view to organizing similar work for the American armies.

DR. ALFRED COX, O.B.E.

THE inclusion of Dr. Alfred Cox's name among the Birthday Honours announced in the JOURNAL last week has been observed with warm approval by all medical men and women to whom he is known personally, or through his unremitting public services as Medical Secretary of the British Medical Association, and co-secretary of the Central Medical War Committee. This general feeling was expressed by the Stratford Division of the British Medical Association, which at a meeting on June 12th passed a unanimous resolution congratulating Dr. Cox upon his appointment as an Officer of the Order of the British Empire.

THE splendid response made by the students of Trinity College, Dublin, to the call of duty is well illustrated by the great diminution in the number of students on the college books shown for each year in the second volume of the *Calendar*. Since the war began the number of men students has fallen steadily. In the year 1913–14 there were 1,074 men students on the books, this term there are only 576, including many South Africans and others who have already served in the war. The number would be still lower but for the fact that the Royal Navy and the War Office have sent back a number of medical students to complete their medical course. The number of women students has remained nearly constant in spite of larger entries. This has been brought about by the fact that many women students have temporarily given up their studies to undertake war work. At the moment there are 192 women on the college books. Of the total number of students on the books a very large proportion are in the medical school.

Medical Notes in Parliament.

Pay of Territorial Medical Officers.

COMMANDER BELLAIRS asked Mr. Forster on June 18th (1) whether the Army Council had refused the request of the British Medical Association that the position of the officers of the Royal Army Medical Corps who patriotically came forward before the war as Territorial and Special Reserve officers should, in regard to pay, allowances, and gratuities, be brought to the same level as that of the Temporary Commission contract officers by an increase in the gratuities to which they were entitled on demobilization; (2) if he would say on what grounds the Government negatived the recommendation of the Departmental Committee of 1917 that officers of the Royal Army Medical Corps, Territorial Force, and Special Reserve, who joined before the war, should be put on a level with temporarily commissioned contract officers as regards pay, allowances, and gratuities, where they would gain thereby; and whether he was aware that dissatisfaction was felt by the junior medical officers of the Territorial Force and Special Reserve at the refusal of the Government to remove this injustice. Mr. Forster said he had nothing to add to his previous replies. The British Medical Association brought forward no considerations that were not fully appreciated by the Cabinet Committee which decided this question.

Commander Bellairs asked what criterion the War Office adopted in this matter. Did it not consider that those who joined first should be treated at least as well as those who joined last? Mr. Forster said that with these officers, as with others, it was partly a matter of the terms of contract of service.

Examinations by National Service Medical Boards.

In reply to Mr. P. A. Harris, Mr. Beck, Parliamentary Secretary, Ministry of National Service, said on June 13th that certain complaints of cursory and inadequate examinations by National Service Medical Boards had been made. They were comparatively few, and on investigation had generally proved not to be well founded. Under the sectional method of examination adequate time must be devoted to the examination of each man. Great care was exercised under instructions issued by the Ministry to take into consideration any information given to the board, either in the form of medical certificates or verbally by the men themselves. Moreover, any man who was dissatisfied had a right to lodge an application with the Appeal Tribunal for examination by medical assessors appointed by the Local Government Board. Mr. Beck added, in answer to Mr. Harcourt, that most explicit instructions were issued that certificates of private practitioners should be taken into account. In every medical board room he had seen there had been a notice posted asking men to produce any medical certificates that they had brought with them. On further questions by Mr. Morel, Mr. Beck said the instructions issued to the boards were most elaborate and were published.

Reduced Membership of Medical Boards.

In a written answer to Sir Herbert Nield, who asked whether any of the provincial boards had been reduced from five to three members and under what authority this change had been effected, Mr. Beck stated that the information was not available, and could be obtained only by asking for daily returns, which would seriously increase the work of the already overworked boards. The normal National Service Medical Board consisted of five doctors, but in times of pressure these might be reduced to three. This course was quite unavoidable owing to the serious shortage of doctors. Sir H. Nield also asked whether any, and, if so, how many, members of the medical board had resigned since November 1st, 1917; in how many cases such resignations were due to alleged differences of opinion between the members of medical boards and the president of the board, owing to his action in disregarding the opinions of members of the board and placing men in a higher grade than that in which the members thought the man should be placed; what proportion of men so examined were personally examined by the president; and what opportunities were afforded other members of the board for further examination or for discussion before the grade was determined by them. Mr. Beck replied that out of some 2,500 doctors serving as members of medical boards sixteen had resigned since November, 1917. So far as he was aware, none had resigned on the grounds suggested. In reply to another question by Sir H. Nield, he said that the National Service Medical Boards at Conduit Street, which had been specially dealing with men coming under the extended age limits, had, during this temporary high pressure, necessarily been composed of three members, and it had not been practical as yet to increase that number. With regard to the other boards in the London region he should require to have detailed inquiries made, as the composition of the boards had varied with the pressure of recruits attending for examination, and the number of doctors available for service on the panel. Mr. Beck stated, on June 19th, that of the men of the

new military age examined at Conduit Street down to June 13th the percentage passed in Grade I was 29.1.

Examinations of Older Men.

In reply to Sir Francis Lowe, on June 18th, the Minister of National Service said that there had been no change in the standards of medical fitness required for classification in Grades I and II. When introduced in October last, the term "Grade I" was defined as meaning men "who attain the normal standard of health and strength and are capable of enduring physical exertion suitable to their age." This definition had never been varied. Current statistics covering large numbers of examinations showed that there is no increase in the proportion of men placed in Grades I and II. There was no difference in principle in the grading of men above and below 43 years of age.

Sir F. Lowe asked whether some definite action would not be taken to counteract the alteration of policy which was undoubtedly taking place in the tribunals all over the country. Sir A. Geddes replied that there had been no alteration of policy in the Government department concerned. There had been announced by certain chairmen of tribunals and appeal tribunals a change in policy in their action, but that had nothing whatever to do with the Ministry of National Service. The number of complaints received was extraordinarily small, less than 1 per cent. among the last 1,250,000 examinations by National Service Medical Boards.

Sir Francis Lowe next asked if the Chairman of the House of Commons Tribunal had not expressed very strong views on this matter. Sir A. Geddes replied that he could only believe that the chairman of that tribunal did not know the meaning of Grade I when he made the statement. In answer to Mr. Snowden Sir Auckland explained that from the last one million and a quarter men examined they had received 11,441 protests of one sort or another; that number included appeals. Of the total number of appeals against medical examinations, 7,800 had already been dealt with by the appeal tribunal, and 4,266 cases dealt with by the tribunals had been allowed to go forward to the assessors; in 3,679 cases permission to go to the assessors had been refused by the tribunals. He could not say whether all these 11,000 cases occurred subsequent to the last Military Service Act.

In reply to a question by Mr. Hogg, Sir Auckland said the Chairman of the House of Commons Tribunal had stated, according to the press reports, that all Grade I men of the new military age were to be regarded by him as being Grade II. In view of the fact that Grade I was defined as meaning "a man who attains the normal standard of health and strength and is capable of enduring physical exertion suitable to his age," that statement of the Chairman of the House of Commons Appeal Tribunal could have no meaning.

Examination of Haemophiliac.

At the close of the debate on June 13th on the vote of credit, Sir Frederick Banbury read a long letter from the cousin of a solicitor in the City of London, aged 43, who was a haemophiliac, and belonged to a family known to be subject to that disorder. The gentleman when examined at Camberwell on May 31st produced a statement from his ordinary medical attendant and also from a specialist. It was alleged that he was nevertheless put through certain exercises and made to bend his knees, and that he shortly afterwards suffered from pulmonary haemorrhage, which endangered his life. He was put in Grade III. Sir Frederick Banbury added that though it might be untrue that the doctors had received private instructions to pass everybody that they possibly could, there was a strong feeling that something of the sort had been done. Sir Auckland Geddes, in his reply, said that there were no instructions that every man should be passed in some grade or to do some service. He had made it his business since the allegation had been made to search not only at head quarters, but in twenty-four places where examinations were going on; there were no secret instructions in the ordinary sense, and he could find no trace of such instructions existing. With regard to the case at Camberwell, he said he had made inquiries of the three doctors concerned, who stated that the gentleman referred to was not put through the ordinary routine examination. The certificate he presented to the board showing that he was suffering from haemophilia was received and accepted. The gentleman was asked to bend his knees, but when he explained that he could not the request was not persisted in. Sir Auckland Geddes thought that the bleeding from the lung might have been brought about by the excitement of the examination or the exertion involved in going to be examined, and added that he would investigate this particular case further.

Duties of the Inspector of Medical Services.—Mr. Alden asked Mr. Macpherson, on June 17th, whether Sir William Babtie had been appointed Medical Adviser to the Adjutant-General, and, if so, whether, having regard to the findings of the Mesopotamian Commission, he would consider the advisability of placing some other medical man in this position. Mr. Macpherson replied: Sir William Babtie, V.C., has not been appointed Medical Adviser to the Adjutant-General. At present he is Inspector of Medical Services for such duties as he may from time to time be directed to carry out. He is an officer of wide experience, and has an intimate knowledge of everything connected with the medical services of the army. On account of the reference to Sir William Babtie in connexion with the inquiry of the Mesopotamian Commission, his case was referred to the Army Council, which, after full consideration of all the facts, decided that the explanation he had been called upon to offer was satisfactory in all respects, and that his services should not be lost to the army. Sir H. Craik: Is it not the case that the findings of the Mesopotamian Commission threw no personal aspersion whatever on Sir William Babtie? Mr. Macpherson: Not only is that so, but they recommended in so many words that he should be re-employed.

Medical Cases in Training under Pensions Department.—Mr. Hodge, in reply to Mr. Anderson on June 12th, said that the number of medical cases receiving training in the week ended June 5th, 1918, and the number which had received training under the Ministry up to that date, were 6,526 and 7,613 respectively, or a total of 14,139, made up thus:

	Under Training.	Trained.
General subjects (Institutions and Workshops)	4,477	2,722
Blind (St. Dunstan's)	561	422
Lord Roberts Memorial Workshops	755	1,385
Munition work	733	3,084
	6,526	7,613
Total	14,139	

In practically every case men who had completed courses of training had been put in employment.

Midwives Bill.—The Midwives Bill, introduced in the House of Lords by the Lord President of the Council on June 13th, is designed to bring the English law into line with the Acts passed for Scotland in 1915 and for Ireland this year. These Acts were based on the Midwives Act of 1902, with amendments suggested by experience. Most of these changes and additions were included in the recommendations of the Midwives Act Committee of 1909.

Cheadle Board of Guardians: Medical Officers.—Sir Watson Cheyne asked Mr. Hayes Fisher, on June 17th, whether the recent appointment by the Cheadle Board of Guardians and District Council of a whole-time medical officer to take the place of six part-time medical officers in a district of 54,000 acres and 26,000 inhabitants, was strongly disapproved locally both by the public and by the medical profession; whether, as had been represented to the Local Government Board, it would be impossible for one man to carry out the duties efficiently, and the interests of the sick poor in the area would suffer seriously, especially having regard to the difficulty of access to many parts of the area and the impossibility of securing a deputy or of obtaining assistance in difficult cases or those requiring anaesthetics or operations. Sir Watson Cheyne further asked whether the Local Government Board would reconsider the sanction it had given to the appointment to the new post of a young man of military age, when the work could be and was being done by older men resident in the area and occupied in other civilian medical work. Mr. Hayes Fisher referred Sir Watson Cheyne to the answer given to a similar question put by Colonel Wedgwood. That reply stated that the appointment was made jointly by the Cheadle Guardians and the Cheadle Rural District Council, whose areas coincided, and was approved by the Local Government Board for the period of the war. The arrangement was fully considered, and appeared to be the best practicable in existing circumstances. While Mr. Hayes Fisher did not think there was any ground for apprehending that the health of the district would suffer from the arrangement, he would have further inquiry made into the matter. He now added that the doctor appointed was of military age—38 years—but, being a native of India, was ineligible for a commission in the R.A.M.C. Sir Watson Cheyne then asked whether it was not a fact that the dispute arose owing to the local doctors asking for an increase in salary, and was that not desirable in view of the great increase in the cost of living? Mr. Fisher admitted that was the origin of the dispute, but he understood that the local authorities were willing to grant the increase in some cases but not in others. He had no means of judging as to the merits of that decision.

Army Dental Service.—Taking up a number of questions put by Mr. Pennefather and Mr. Whyte, on June 18th, Mr. Macpherson announced that the number of dental surgeons employed in the Royal Army Medical Corps is about to be largely increased. Mr. Whyte put it that the number at present employed with the British Expeditionary Force in France was less than one-half that employed in a similar capacity in the Canadian Expeditionary Force. On that Mr. Macpherson said that before our soldiers went to the front their dentures were looked at by dentists, but the Canadians were not so examined before they left Canada. Mr. Pennefather said that according to his information the teeth of every Canadian were examined before crossing, and there was a re-examination before the man went to the front. There was a further re-examination every time a man came back wounded.

"*Manipulative Surgery.*"—It is announced that an Army Council Instruction has been issued to all commands in the United Kingdom directing that "no obstacle will be placed in the way of an officer or soldier who desires to avail himself of the services of a practitioner in manipulative surgery who is not a qualified practitioner." This follows on a statement by Mr. Macpherson last August that he saw no objection to a soldier going for treatment to an unqualified man, but that if he did he went on his own responsibility.

NOTES ON THE PRESERVATION OF FRUIT.

BY

HERBERT E. DURHAM, Sc.D., ETC.,

PRESIDENT, HEREFORDSHIRE ASSOCIATION OF FRUIT GROWERS AND HORTICULTURISTS.

THE methods by which fruit may be preserved for a more or less indefinite period are as jam, by bottling or canning, by making into a paste or "massa," and by simple drying. Certain fruits, such as apples and pears of suitable kinds, will keep for many months if properly stored. There are many extremely good sorts of apples which will keep till April, May, and even June. Unfortunately this year the crop of fruits of all kinds in most parts of the country will be poor, and possibly the amount of sugar allowed to the private owner for jam making may be sufficient for his fruit.

As the making of jam in factories is now largely under Government control, it seems not unreasonable to suggest incidentally that the manufacturers should be required to make a declaration as to the substances other than the named fruit used in making the jam. If the basis of a jam is pulp made from apples, plums, or vegetable marrow, the named fruit being practically used only as a flavouring agent, the fact should be declared. One of the merits of jam is that it affords a mode of obtaining in the diet necessary labile substances, vitamines or what-not, when fresh fruit is not available. In a jam factory the fruit, such as currants, is usually "pulped," and kept; it is recooked when the apples are ready, and in this way the vitamines may be lost. The label, "Currant jam: made solely from sound fruit and sugar," may prove misleading to the purchaser, who is apt to assume that the fruit referred to on the label is currant and not largely diluted with apple or vegetable marrow.

Much can be done without sugar at the time of preservation, and the following notes may be of use:

Bottling.—When water without sugar is used in bottling a diffusion of the sugar and other substances in the fruit takes place from within it into the water, until an equilibrium is established. The individual fruits then become little more than tasteless bags, which can only be satisfactorily served at table when mashed into a *purée* or "fool." This may be obviated and a permanent equilibrium established by making juice from some of the fruit and using it to fill up the bottles. The juice may be made either by cooking some of the fruit in a small amount of water and then straining off the juice and squeezing the residue well in a cloth; or by the use of a fruit press—the Enterprise or some similar pattern—which is far more economical and saves time, for leaves and stalks need not be separated from the fruit, the juice thus obtained should be heated before it is put into the bottles. The fruit, of course, may be pulped or the juice only bottled, and then it is perhaps a good plan to use small bottles, so that a whole bottle is soon consumed. The same sort of juice need not be used; for instance, raspberry or red currant juice may be used the one for the other. Plum or apple decocted to a moderately thick syrup might be used, judging from the very fair blackberry jam that can be made by the addition of apple juice from the cider press concentrated to a syrup.

Paste or Massa.—This is a valuable mode of conserving various fruits. It can be utilized in several ways, as by making sances to eat with puddings, to work up into jam, or, in the case of quince and medlar, to add to apples. Whilst it is more ideal to use sugar in some cases (for example, apple) in the preparation, a product of perfect keeping quality can be made without it. Taking apple and tomato as two types, the treatment is as follows:

Apples are cut up, or waste cores and skins only may be used; they are cooked with the smallest quantity of water possible; then, cooked soft, they are allowed to cool and passed through a fine cloth gauze or sieve to separate pips, etc. The pulp is then slowly reduced with stirring to prevent burning, which may also be partly fended off by wire gauze or a sheet of iron interposed between the direct flame and the saucepan; the reduction is completed when the wooden spoon stands stiffly alone in the pulp (when sugar is available one-tenth to one-fifth the weight of the pulp may be added). The pulp is then poured into well-greased baking trays, or greased paper may be used to line them or plain paper, but in this case it will have to be moistened when ultimately removed. The layer of pulp should be a quarter to half an inch thick. The trays are then placed to dry, either in the rack over the range, in a slow oven, in the linen cupboard, or in bright sunlight, and dried until the residue is fairly hard but still plastic; it is then rolled up (after removal of the paper, if that has been used) or cut up into squares or lozenges, and stored in paper bags or cardboard boxes in a dry, warmish place, when there is no fear of mouldiness ensuing.

Tomatoes are carefully boiled in water without breaking the skins, the water drained away as completely as possible and the pips and skins strained off (or they may be put direct through an "Enterprise" press), a little salt and, if desired, cayenne and allspice may be added. The *purée* is then slowly reduced to a fairly thick jam, poured into trays, dried and rolled up. Small pieces stirred up with water may be used to flavour soups, stewed haricots or spaghetti, etc. The "massa" keeps perfectly. Should fruit be available, we propose to store black currants, raspberries, etc., by this plan, using, however, the press, as then by two or three passages there is practically no loss of the juice.

The advantage of the paste or massa is that it needs no bottles or jars for its preservation; sugar, where needed, may be added at the time of consumption or final preparation. Apple or quince paste may be made into a jam or *purée* by adding about five times its weight of water, warming slowly for twenty minutes, then just raising to the boil for a short stir.

Simple Drying.—For the simple drying of fruit none of the special outfits advertised is necessary. On a small scale a fair amount can be done with the ordinary baking oven. In a house which possesses a linen or airing cupboard containing a hot-water cylinder, fruit can be dried on a larger scale. Using mainly this method we did last year twenty pounds of dried plums, representing six or seven times their weight in the fresh state. When dried hard they keep perfectly in paper bags. Preliminary treatment in a caustic soda bath or by sulphuring is not necessary, and neither method is likely to add to the dietetic value of the fruit.

Only fruit which is of good size, perfect, and at least nearly ripe, should be used. Fruit which is not perfectly ripe may be spread out on trays made of gauze, wicker, or slats of wood, and kept on the rack over the range for a few days to complete ripening; this is in any case a good plan, as it tends to procure a full flavour. Three or four heatings in a *cool* oven will be needed. It is important that for the earlier heating the temperature should not be above 115° to 120° F. For the second or third not above 150° F., and for the final not above 160° F. Too high a temperature leads to rupture of the skin, escape of syrupy juice, and a general mess. In practice the oven may be allowed to cool off a little at the end of the day, and the trays left in overnight. Next morning they should be taken out and allowed to cool. During this it is well to turn the fruit; in the evening it should be put into the oven for another night. It is safer to leave the oven door ajar, and this should certainly be done during the daytime when the fire is on. To ascertain the temperature a pan of water may be put into the oven and if the hand cannot be held in it for a full minute the temperature will be 140° F. or more. It is inadvisable to put in fresh fruit with partly dried fruit. Too high a temperature leads to agglutination of the contents of the fruit through destruction of pectins, if not to rupture through swelling.

With the hot cupboard of a hot-water service there is little or no risk of overheating; treatment for a week every day or every few days, with daily withdrawal to cool, is needed to get the complete desiccation I prefer. If the operator stops when the dryness of the ordinary prune has been attained, he must remember that there will be liability to mouldiness if the prunes are stored while still moist in jars or bottles without resort to a final high temperature. With complete desiccation, followed by storage in a dry place, perfect conservation is obtained. If hot sun is available the trays may advantageously be put out; moulds will not grow at body temperature.*

As to vegetables, potatoes dry very rapidly in slices, about a quarter of an inch thick; young broad beans and green beans also dry readily, and give a good product; we did not find that preliminary scalding in boiling water for five seconds, as recommended, is an advantage.

THE WAR.

CASUALTIES IN THE MEDICAL SERVICES.

ROYAL NAVY.

Wounded.

Surgeon Probationer H. G. FitzMaurice, R.N.V.R.

ARMY.

Died of Wounds.

LIEUT.-COLONEL H. MOORE, R.A.M.C.

Lieut.-Colonel Henry Moore, R.A.M.C., who was returned on June 5th as wounded, was reported to have died of wounds, in the casualty list published on June 14th. He was educated in the medical school of the Royal College of Surgeons in Ireland, and took the diplomas of L.R.C.P. and S.Irel. in 1892. After serving as medical officer in Basutoland, and as a civil surgeon in the South African Field Force in 1900–1902, he went into practice in Dublin, where he was demonstrator of anatomy to the Royal College of Surgeons in Ireland, surgeon to the Royal City of Dublin Hospital, and surgeon to the Westmorland Lock Hospital. He had also been surgeon to Mercer's Hospital, Dublin. He took a temporary commission as

* In the Lot, the centre of the French dried fruit industry, fruit is dried on wicker hurdles in the sun. The "Imperial" plums in glass jars are finally put through an autoclave.

lieutenant in the R.A.M.C. on August 11th, 1914, was promoted to captain on completion of a year's service, and recently to temporary lieutenant-colonel. He received the Military Cross on June 3rd, 1917.

CAPTAIN K. ATKIN, R.A.M.C.

Captain Keyser Atkin, R.A.M.C., died of wounds at a dressing station on June 6th, aged 25. He was the only son of Mr. P. W. Atkin, stipendiary magistrate of Salford, and was educated at Cambridge, where he gained his rowing blue in 1913 and graduated B.A., and at Manchester University. He took the diplomas of M.R.C.S. and L.R.C.P.Lond. in 1916, and after acting as house-surgeon at the Manchester Royal Infirmary, and as house-physician at St. Mary's Hospital for Women and Children, Manchester, took a temporary commission as lieutenant in the R.A.M.C. He was promoted to captain after a year's service, and was taken prisoner last year, but exchanged a few months ago.

CAPTAIN W. F. MCISAAC, C.A.M.C.

Captain W. F. McIsaac, Canadian Army Medical Corps, was reported as having died of wounds, in the casualty list published on June 13th. He was previously returned on June 3rd as wounded in the attack on the Canadian hospitals at Étaples towards the end of May.

LIEUTENANT J. W. SENTER, R.A.M.C.

Lieutenant John Watt Senter, R.A.M.C., died of wounds on June 9th. He first qualified as a chemist, and while carrying on that business went through the medical course at Edinburgh University, where he graduated M.B. and Ch.B. in 1910, and B.Sc. in Public Health in 1912. After acting as house-surgeon in the eye department, and in the ear, nose, and throat department, at Edinburgh Royal Infirmary, he went into practice in Mayfield Road, Edinburgh. He took a temporary commission in the R.A.M.C. in June, 1917. He had previously served in the South African war.

Wounded.

Lieut.-Colonel G. J. Ormsby, D.S.O., R.A.M.C.
Major F. L. Bignell, Australian A.M.C.
Major G. S. Mothersill, D.S.O., Canadian A.M.C.
Captain J. N. L. Blamey, R.A.M.C. (temporary).
Captain D. A. Davis, Australian A.M.C.
Captain W. B. Gordon, R.A.M.C. (temporary).
Captain F. Hall, R.A.M.C. (temporary).
Captain S. A. Henry, R.A.M.C. (temporary).
Captain T. H. Houston, R.A.M.C. (temporary).
Captain A. H. Huycke, R.A.M.C. (temporary).
Captain J. E. W. Macfall, R.A.M.C.(T.F.).
Captain L. L. Satow, M.C., R.A.M.C. (temporary).
Captain W. N. Soden, M.C., R.A.M.C. (temporary).
Captain H. M. Stephenson, M.C., R.A.M.C. (temporary).
Captain H. P. Thompson, R.A.M.C. (temporary).
Captain T. R. Trounce, R.A.M.C. (temporary).
Captain W. Wilson, R.A.M.C.
Lieutenant F. Coates, R.A.M.C. (temporary).
Lieutenant and Quartermaster L. E. Hine, R.A.M.C.

Missing.

Lieut.-Colonel W. B. Kelly, D.S.O., R.A.M.C.
Major F. G. Lescher, M.C., R.A.M.C.(S.R.).
Captain T. Blackwood, R.A.M.C. (temporary).
Captain R. M. Coalbank, R.A.M.C. (temporary).
Captain C. R. Crowther, R.A.M.C. (T.F.).
Captain W. F. Dunlop, R.A.M.C. (temporary).
Captain M. S. Esler, R.A.M.C. (temporary).
Captain D. Gillespie, R.A.M.C. (temporary).
Captain W. G. Harnett, R.A.M.C. (temporary).
Captain G. F. F. Heathcote, M.C., R.A.M.C. (temporary).
Captain N. A. A. Hughes, R.A.M.C. (temporary).
Captain C. C. Jones, R.A.M.C.
Captain H. F. McCoughey, R.A.M.C. (temporary).
Captain W. T. P. Meade-King, R.A.M.C.(T.F.).
Captain H. S. Moore, R.A.M.C. (temporary).
Captain R. W. Pearson, M.C., R.A.M.C. (temporary).
Captain A. B. Simpson, R.A.M.C. (temporary).
Captain D. M. Smith, R.A.M.C. (temporary).
Captain C. Witts, R.A.M.C. (temporary).
Lieutenant A. Boyle, R.A.M.C. (temporary).
Lieutenant A. S. Findlay, R.A.M.C. (temporary).
Lieutenant J. Findlay, R.A.M.C. (temporary).
Lieutenant J. W. Jones, R.A.M.C. (temporary).
Lieutenant F. W. M. Lamb, R.A.M.C. (temporary).
Lieutenant A. M. McCormick, R.A.M.C. (temporary).
Lieutenant F. B. O'Dowd, R.A.M.C. (temporary).

Prisoners of War.

Major J. S. McConnachie, R.A.M.C.(T.F.).
Captain M. T. Ascough, R.A.M.C.(T.F.).
Captain W. M. Christie, R.A.M.C. (temporary).
Captain S. S. Meighan, R.A.M.C.(T.F.).

DEATHS OF SONS OF MEDICAL MEN.

Beresford, Spencer Charles, Second Lieutenant 1st Royal Berkshire Regiment, eldest son of Dr. C. W. Beresford of Markyate House, Narborough, near Leicester, killed in action in France, June 5th, 1918.

Thomas, Francis Gerald, Captain in the merchant service, fifth son of William Thomas, M.B.Lond., F.R.C.S., of Birmingham, torpedoed at sea, June 8th, 1918.

Thomas, Geoffrey Lynn, M.C., Captain R.F.A., elder son of Dr. Ieuan Thomas of Maesyffrwd, Hirwain, killed recently, aged 24. He got his first commission on November 16th, 1914.

Thorne, T. Bezley Houghton, Lieut.-Colonel North Staffordshire Regiment, son of the late Dr. Bezley Thorne, killed March 21st. He served through the South African war, was mentioned in dispatches, and received both King's and Queen's medals, with five clasps. He became lieutenant in the Reserve of Officers on March 29th, 1901. On October 14th, 1914, he was appointed major in a service battalion of the Duke of Cambridge's Own Middlesex Regiment, and went to France in that capacity early in 1915, and in 1916 was appointed to command a battalion of the North Staffordshires.

[We shall be indebted to relatives of those who are killed in action or die in the war for information which will enable us to make these notes as complete and accurate as possible.]

MENTIONED IN DISPATCHES.

THE following are among the names mentioned by General Sir E. H. H. Allenby, Commander-in-Chief, Egyptian Expeditionary Force, in a dispatch dated April 3rd, as deserving of special mention for distinguished and gallant services and devotion to duty:

Royal Navy.

Temporary Surgeon A. H. Richardson.

Staff.

Colonel G. T. K. Maurice, C.M.G., A.M.S.
Brevet Colonel W. W. White, I.M.S.
Lieut.-Colonel (temporary Colonel) E. P. Sewell, D.S.O., R.A.M.C.
Lieut.-Colonel A. L. Dawson, A.A.M.C.
Major C. E. Hercus, N.Z.M.C.
Captain F. W. C. Brown, R.A.M.C.

Army Medical Service and Royal Army Medical Corps.

Colonel D. O'Sullivan.
Lieut.-Colonel W. P. Gwynn.
Temporary Lieut.-Colonel J. W. Barrett, C.B., C.M.G.
Major (acting Lieut.-Colonel) W. F. Ellis.
Captains (acting Lieut.-Colonels): H. W. Carson, G. F. Rudkin, D.S.O.
Captain (acting Major) W. W. Treves.
Captain W. H. Sheffield.
Temporary Captain (acting Lieut.-Colonel) A. T. Mulhall.
Temporary Captains: L. Leslie, the Hon. L. H. Lindley, T. F. Lumb, P. W. Moore, E. B. Smith, J. G. Willmore.
Lieutenant (temporary Captain) E. Catford.
Temporary Lieutenant H. G. Sparrow.
Quartermaster and honorary Captain T. E. Coggon.

Indian Medical Service.

Lieut.-Colonel R. W. Knox, D.S.O.
Majors S. W. Jones, M. F. White.

Royal Army Medical Corps (T.F.).

Lieut.-Colonels: T. H. Forrest, D.S.O., A. G. Hamilton, H. W. Thomson.
Major (acting Lieut.-Colonel) J. W. Leitch.
Captain (temporary Lieut.-Colonel) J. Young.
Captains (temporary Majors): T. G. Buchanan, H. J. Dunbar.
Captain (acting Lieut.-Colonel) T. B. Layton.
Captains: C. H. Allen, C. S. P. Black, M.C., C. H. Budd, M.C., W. K. Churchouse, H. N. McC. Coombs, M.C., W. F. Corfield, A. D. Downes, W. T. Henderson, E. A. Mackenzie, G. R. Rickett, A. B. P. Smith, J. B. Stanley, O. Teichmann, M.C., F. Ward, G. H. H. Waylen, G. A. Williamson, K. B. Williamson.
Temporary Captain C. W. Jenner.

Australian Army Medical Corps.

Lieut.-Colonel R. Fowler.
Major (temporary Lieut.-Colonel) G. E. M. Stuart.
Major C. V. Single.
Captain E. T. Pascoe.
Honorary Lieutenant G. G. Grant.

Italian Medical Corps.

Capitano V. Bianchi.

The list also contains a number of names of warrant officers, N.C.O.'s, and privates of the R.A.M.C., R.A.M.C.(T.F.), A.A.M.C., N.Z.M.C., and of the I.S.M.D., as well as some members of the British Red Cross and Voluntary Aid Detachment.

ORDER OF THE BRITISH EMPIRE.

The names of Colonel Francis John Walker, V.D., County Director, Auxiliary Hospitals and V.A.D.'s, North Lincolnshire, and Major Robert Henry Hogg, officer in charge of New Zealand Officers' Hospital, Brockenhurst, should have been included in the list of those appointed as Officers of the Order of the British Empire published last week, p. 680.

Correspondence.

AGGLUTINATION IN THE DIAGNOSIS OF DYSENTERY.

SIR,—In the interesting and important article which appeared under the above title in your number of June 8th Lieut.-Colonel C. J. Martin and his fellow-workers make the following reference to Dreyer's system of standardization of agglutinable cultures:

> The results are expressed in terms of Dreyer's standard agglutinin units by taking into account the factor on the bottle representing the relative agglutinability of the particular sample *according to its behaviour with some arbitrarily selected serum.* (My italics.)

It is to be feared that this statement will give the reader an erroneous idea of Professor Dreyer's system, for it is not the behaviour of the culture with any sample of *serum* that determines its numerical factor of agglutinability, but its behaviour (using *any* serum) as compared with an arbitrarily selected formolized broth *culture*, which is taken as a standard, or with another culture that has been standardized against the original one. This fact is of prime importance because formolized cultures possess a very much higher degree of stability than any serum, and it is just this that makes it possible to use them as standards.

To quote the "Directions for the Preparation and Standardization of Agglutinable Cultures," issued to all who use these materials:

> The process of standardization (of a culture) consists . . . in measuring its agglutinability *as compared with the standard agglutinable culture* by the use of the standard serum. (My italics.)

I have thought it all the more necessary to draw attention to this misunderstanding because of the large audience which Colonel Martin's article is sure to have and because of the authoritative value attached to any statement made under his name.—I am, etc.,

A. D. GARDNER, M.D., F.R.C.S.,
Bacteriologist in Charge of the Standards Laboratory.

University of Oxford,
June 18th.

THE NERVOUS TEMPERAMENT IN WAR.

SIR,—Your editorial under the above heading on June 8th (p. 649) is at the present time of great practical interest.

It would appear that Professor Dupré claims to describe a definite clinical entity under the term "*constitution émotive*," and that I do not dispute, but I fail to see that he describes any new condition not already familiar to some of us long before the war, and so thoroughly described by several British writers under the names "neurasthenia minor," "neurasthenoid," "pre-neurasthenic," etc. Personally, I think that the term "congenital neurasthenia" is preferable, because of the strong hereditary element in the production of this lifelong condition, which is allied to true neurasthenia and into which it may easily develop, by any strong emotional shock, or after the age of about 40, when the failing activities of the kidneys, etc., leads to auto-intoxications.

Although, as pointed out, an exaggerated response to stimuli is normal in infancy and perhaps childhood, yet in the neurasthenoid child or congenital neurasthenic the sensitiveness is still further exaggerated.

The signs and symptoms whereby Dupré characterizes his "*constitution émotive*" are largely covered by those of neurasthenia minor, the manifestations of which, both on the physical and mental side, are too numerous to refer to here, but are so admirably described by such writers as Clive Riviere and Campbell Smith, etc.

The point of practical interest at the present day about the congenital neurasthenic is that his or her outlook on life is markedly different from that of normal sane people. Just as there is a lack of inhibition on the physical side, so there is on the mental side, as exhibited by impulsiveness, low psychlampsic point, exaggerated ideas, and a host of other psychasthenic conditions. Their phobias, which take many different forms, may make life a terror for them.

The war no doubt has brought these individuals into prominence, but, like the poor, they are always with us, though somewhat sparsely scattered. During a period of examining recruits at the early part of the war I came across a few of these cases, one of whom I specially remember nearly collapsed from fright; he had been made to offer to enrol by his employer. If one judges recruits simply by their physical make-up these cases may easily be overlooked, and that would be a gross blunder, as this condition quite unfits them for soldiers. The tell-tale rapid heart should, however, always put us on the *qui vive* for other symptoms which point more conclusively to this condition of congenital neurasthenia. Mentally, morally, and physically, these cases do not make good soldiers, and instead of being subsequently discharged after costing the nation say £100, they should be rejected at the beginning. They are, I suspect, the material out of which are made some, if not most, of our conscientious objectors, to say nothing of certain anticonscriptionists and bomb dodgers, so that their loss to the army would be practically *nil*.—I am, etc.,

LATE CIVIL SURGEON.

June 10th.

A COMMON RESPIRATORY DISABILITY.

SIR,—What is to be done to lessen the future incidence of the very common sufferer from the effects of nasal obstruction?

During these very trying times there are referred to the tuberculosis officer large numbers of men called up for military service or discharged, who, while able to do hard work, are quite unfit for training. Retraction and emphysema, with resulting enlarged right heart, do not prevent such a man working as a blacksmith or even as a coal-miner, but a short spell of service makes them problems for the Local Pensions Committee.

The patient usually says that asthma is in the family, and it is certain that heredity is the chief factor in producing the disability.—I am, etc.,

J. LEWIS THOMAS.

Newport (Mon.), June 2nd.

PAY OF TERRITORIAL OFFICERS.

SIR,—I notice that, in answer to Commander Bellairs, Mr. Forster stated in the House of Commons that Territorial officers of the R.A.M.C. got the same emoluments as regular officers. This is incorrect. A regular captain R.A.M.C. receives 15s. 6d. a day on promotion, after seven years' service 17s., and after ten years 21s. A Territorial officer of the same service still receives the minimum rate of 15s. 6d. This, of course, is due to the refusal of the War Office to recognize pre-war service as qualifying for the extra pay. As is well known, scores of Territorial medical officers had on mobilization to relinquish good practices and comfortable incomes, and who at the present time are, after several years of pre-war service, receiving the minimum pay of a captain R.A.M.C.—I am, etc.,

MAJOR R.A.M.C.(T.F.).

June 11th.

Obituary.

LOUIS ALBERT DUNN, M.S.LOND., F.R.C.S.,

Senior Surgeon to Guy's Hospital.

MR. L. A. DUNN died in the private ward of Guy's Hospital in the early morning of June 8th, after a long and trying illness. He was the youngest son of the late J. Roberts Dunn, J.P., D.L., of Stone House, Warbleton, Sussex, and was born in 1858. At Guy's Hospital he gained the Ormerod Scholarship, and obtained the diplomas M.R.C.S. and L.S.A. in 1882. In the following year he graduated M.B. and B.S.Lond. with honours; in 1884 he became F.R.C.S., and in 1888 took the M.S. degree, winning the gold medal. Mr. Dunn's whole career was bound up with Guy's Hospital and its medical school, in which he held successively the posts of demonstrator of anatomy, surgical registrar, warden of the College, assistant surgeon, joint lecturer on surgery, and surgeon. He was also consulting surgeon to the East London Hospital for Children, and to St. Mary's Children's Hospital, Plaistow. He served for ten years as a member of the Court of Examiners of the Royal College of Surgeons, and was elected to the Council in 1913.

We are indebted to Mr. F. J. STEWARD for the following appreciation:

The news of the death of L. A. Dunn will bring a sense of real personal loss to a very large number of Guy's men.

For "John" Dunn, as he was always called at Guy's, was, from the day he became demonstrator of anatomy until his last illness, above all the students' friend, and many are those who realize that but for his kindly and persevering teaching they would in all probability never have qualified. After a brilliant student career John Dunn became demonstrator of anatomy in 1885, and held this post until he was appointed assistant surgeon in 1894. In the dissecting room he acquired a quite extraordinary influence over the boys, as he called them, for, besides being an unusually clear and helpful teacher, he had a great charm of manner, and took a real personal interest in each of his pupils, thus gaining the friendship and getting the best out of each one. At the same time he was a strict disciplinarian, for, kindly and familiar as he was, he had complete control, and never permitted laziness or slackness in attendance. And so again in the wards and out-patient department his clear, patient, and helpful clinical teaching was an immense boon to generations of students, each of whom he knew and understood and remembered in a quite remarkable degree. In fact, it seemed to those who knew him best that his greatest interest in life was his teaching and his personal relationship with the students. That all he did for them was properly appreciated by the men is not in doubt, for it would be hard to imagine a teacher more popular and universally more loved and esteemed. He was a very accurate clinical observer and was also possessed of a great clinical memory; often has he thrown some fresh light on a difficult case seen with the writer or others of his colleagues. As an operator, whilst he would not be described as either brilliant or showy, his work was always neat, decided, and accurate. Charming and friendly to all with whom he came in contact, he was also retiring and self-contained almost to exasperation, so that even his oldest and best friends saw really but little of him.

SAMUEL POZZI,

Professor of Clinical Gynaecology, Paris.

PROFESSOR POZZI, whose name is well known wherever surgery is practised, was murdered in his consulting room on June 13th. His murderer, who immediately afterwards committed suicide, was a man upon whom Professor Pozzi had operated about two years ago, and his grievance was that his surgeon would not operate upon him again. Professor Pozzi was wounded in the abdomen by four revolver shots. On his own instructions he was removed to the Astoria Hospital, where laparotomy was performed, twelve perforations of the intestine and a wound in the kidney being found. He survived only a few hours.

Samuel Pozzi was born at Bergerac (Dordogne) on October 3rd, 1846. He had a brilliant career as a student, becoming interne of the Paris hospitals in 1868 and winning the gold medal of the faculty in 1872. In 1873 he graduated with a thesis on fistulae of the upper pelvi-rectal space, for which he was awarded a bronze medal, and in 1875 he became *agrégé* with a thesis on the value of hysterotomy in the treatment of uterine fibroma. He was already well known by his work in comparative anatomy when he was elected surgeon to the hospitals in 1877. In 1878 he was appointed surgeon to the public lunatic asylums of the Seine Department, and in 1885 he was attached to the Lourcine hospital. From that time he gave his attention mainly to diseases of women, and was one of the pioneers of operative gynaecology in France. He was the author of a treatise on clinical and operative gynaecology which has gone through several editions. For this work, which has been translated into English, German, Italian, and Spanish, he was awarded a prize by the Institute of France. Among his many contributions to medical literature are an important article in the *Dictionnaire Encyclopédique des sciences médicales* and a translation, made in conjunction with Dr. Benoit, of Charles Darwin's book on the expression of emotions in men and animals. Pozzi was one of the founders of the French Congress of Surgery, of which he was general secretary till 1885. He was brilliant as a teacher not only in gynaecology but in anatomy and operative surgery. He was a favourite pupil of Broca, and in 1888 held the office of president of the Society of Anthropology. At the time of his death Professor Pozzi was professor of clinical gynaecology and surgeon to the Broca Hospital, and director of the surgical division of the military hospital at the Panthéon. He was a member of the Académie de Médecine, was elected vice-president this year, and would have been president next year. He was senator for his native department for nine years.

Universities and Colleges.

UNIVERSITY OF CAMBRIDGE.

C. R. A. THACKER, M.B., B.C., has been elected to a Fellowship at Sidney Sussex College. The following medical degrees have been conferred:

M.D.: W. A. Stokes, W. J. Fison. *M.C.*: H. J. Gauvain. *M.B.*: K. B. Aikman.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

AN ordinary Council was held on June 13th, when Sir George Makins, G.C.M.G., President, was in the chair.

The late Mr. L. A. Dunn.—A vote of condolence was passed on the recent death of Mr. Dunn, a member of the Council and past member of the Court of Examiners. The vacancy in the Council occasioned by the death of Mr. Dunn will be filled up at the annual meeting of Fellows in July, 1919.

Grant of Diplomas.—Diplomas of Fellowship were issued to two candidates (Messrs. Ernest F. Murray and David P. D. Wilkie) found qualified at the recent examination. A third candidate (Mr. Arthur Morford) was found qualified, but being under the age of 25, the grant of the diploma was deferred. The Licence in Dental Surgery was granted to eleven candidates found qualified at the recent examination.

Donations.—The thanks of the Council were given to Mr. I. Foster Palmer, M.R.C.S., for a donation of books and engravings.

The Primary Examination for the Fellowship.—A Committee was appointed to consider the desirability of altering or amending the subjects and character of the primary examination for the Fellowship.

Military Orthopaedics.—A letter was read from a provincial hospital calling attention to the manner in which the hospitals and medical schools are being affected by the steps taken by the Ministry of Pensions, in conjunction with the War Office, to eliminate cases of military injuries on a very wide definition of "orthopaedics" from treatment in certain civil hospitals. The matter was referred to a committee.

Proposed Formation of a Ministry of Health.—A committee was appointed to consider the steps which are being taken to form a Ministry of Health, the committee to co-operate with a similar committee appointed by the Royal College of Physicians.

Medical News.

IT is announced from Amsterdam (June 16th) that an epidemic presenting symptoms similar to that which prevailed recently in Spain, and believed to be influenza, has broken out in Berlin.

PROFESSOR DENTI of Milan has taken the initiative in collecting funds for the establishment of a workshop for men blinded in the war. The subscriptions already amount to £14,360.

WE are informed that the Scottish Women's Hospital evacuated, as mentioned last week, was the advanced hospital at Villers Cotterets. The work of the main hospital at Royaumont, near Chantilly, described by Miss Ivens in our columns on August 18th, 1917, has not been interrupted.

DR. VERNON DAVIES, M.B.E., has been appointed a Knight of Grace of the Order of St. John of Jerusalem in England.

ON the occasion of the twenty-first anniversary of St. Paul's Hospital for Skin and Genito-Urinary Diseases, Dr. Felix Vinrace and Dr. Alfred Allport were entertained to dinner at the Holborn Restaurant on June 14th.

THE proceedings of the Conference on the administration of the Mental Deficiency Act, held in London last February, have been printed in a pamphlet, copies of which can be obtained from the honorary secretary of the Central Association for the Care of the Mentally Defective, Queen Anne's Chambers, Tothill Street, Westminster, S.W.1.

CIVILIAN practitioners desiring to attend the course of instruction on war neuroses and shell shock at the Maudsley Neurological Clearing Hospital (Denmark Hill, S.E.5), for which no fees are charged, are, by desire of the Director-General, A.M.S., requested to bring a letter of introduction from a hospital physician or surgeon. The course begins on Tuesday next at 3 p.m., and will be continued on Tuesdays and Fridays for six weeks.

JUST as the Director-General of the British Army Medical Service has no seat on the Army Council, so the Surgeon-General of the United States Army is not a member of the American General Staff. We learn from the *Journal of the American Medical Association* that a bill has recently been introduced into the House of Representatives proposing that hereafter the Surgeon-General shall be a member of the General Staff Corps.

THE British Thomson-Houston Co., Ltd. (77, Upper Thames Street, London, E.C.4) has completed a scheme for repairing Coolidge *x*-ray tubes which have been damaged or broken.

THE Swiney prize, founded to encourage work on jurisprudence, by Dr. Swiney, who died in 1844, is awarded alternately by the Royal Society of Arts and the Royal College of Physicians for medical and for general jurisprudence. On the last occasion (1914) the prize, which consists of a cup value £100 and money to the same amount, was given for a work on general jurisprudence. The next award, which will be made in January, 1919, will be for a work on medical jurisprudence.

THE annual general meeting of the Asylum Workers' Association, founded in 1895 to promote the betterment of the condition of all classes of persons engaged in the care of those afflicted in mind, was held at the Mansion House, under the presidency of the Lord Mayor, on May 29th. The adoption of the report, which showed an increase of membership and of funds during 1917, was moved by Sir John Jardine, Bt., M.P., President of the Association, who referred to the desirability of further legislation to secure for asylum workers the full benefits which the Asylums Officers' Superannuation Act, obtained by the efforts of the association in 1909, in part conceded to them. The Dean of Windsor, who seconded, laid stress on the need of ample recreation for those engaged in nursing the sick, whether in body or mind, in order to maintain the freshness of spirit so essential in their dealings with patients. Dr. Mercier drew from his reminiscences, some of which were of a very piquant character, to emphasize the call on the long suffering, good nature, self-sacrifice, and devotion to duty of those engaged in nursing mad folk, and to show how much they merited the sympathy of the community at large, especially at this time, when war exigencies had depleted the personnel of asylums. It was, he said, much to the credit of these workers that in a period of such stress the Board of Control had been able to report an unprecedentedly low number of suicides occurring amongst asylum patients. Amongst other speakers were Sir Frederick Needham, Sir George H. Savage, Lieut.-Colonel D. Thomson, Captain Kirkland Whittaker, R.A.M.C., and Major the Rev. S. Lipson, S.C.F

Letters, Notes, and Answers.

AUTHORS desiring reprints of their articles published in the BRITISH MEDICAL JOURNAL are requested to communicate with the Office, 429, Strand, W.C.2, on receipt of proof.

The postal address of the BRITISH MEDICAL ASSOCIATION and BRITISH MEDICAL JOURNAL is 429, Strand, London, W.C.2. The telegraphic addresses are:

1. EDITOR of the BRITISH MEDICAL JOURNAL, *Aitiology, Westrand, London*; telephone, 2631, Gerrard.
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3. MEDICAL SECRETARY, *Medisecra, Westrand, London*; telephone, 2634, Gerrard. The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin.

The address of the Central Medical War Committee for England and Wales is 429, Strand, London, W.C.2; that of the Reference Committee of the Royal Colleges in London is the Examination Hall, 8, Queen Square, Bloomsbury, W.C.1; and that of the Scottish Medical Service Emergency Committee is Royal College of Physicians, Edinburgh.

QUERIES AND ANSWERS.

RETINITIS PIGMENTOSA.

ENQUIRER.—The primary cause of retinitis pigmentosa is not known. To judge by the similarity of effects in other conditions it would appear that the primary defect lies in the blood supply to the retina. Experience shows that there is a progressive diminution of the field of vision, and ultimately of the visual acuity, in all these cases; but the rate of progress of the disease varies widely—very many retain good vision until late in life. Two or more cases may occur in the same family, and are frequently associated with other defects of the body, and particularly of hearing, but not all are hereditary or even familial. Cases which may be considered to be of a congenital and developmental type, in which the condition is atypical (in the common absence of observable retinal changes, or of changes of any extent) and remains stationary, have been minutely described and recorded by Nettleship and others. Reference should be made to Nettleship's paper (*Trans. Ophthalmological Society, U.K.*, vol. xxvii, p. 269), wherein will be found the pedigree of a French family affected with hereditary night blindness in which the defect is known to have occurred in ten generations living through a period of three hundred years; also reference may be made to Nettleship's Bowman Lecture (in the same *Transactions*, vol. xxix, pp. cii and cliii), in which will be found reference to cases of hereditary retinitis pigmentosa and lamellar cataract.

LETTERS NOTES, ETC.

WAS DR. FARQUHARSON ENTITLED TO THE EAGLE'S FEATHER?

DR. CLIPPINGDALE (London, W.) writes: Many Scottish readers of the BRITISH MEDICAL JOURNAL will remember that the head of the clan Farquharson is entitled to wear upon his bonnet an eagle's feather. The Farquharsons of Finzean, of which Dr. Robert Farquharson was the head, contested the chieftainship of the clan with the Farquharsons of Invercauld, of which Mr. James Ross Farquharson is the head. Both septs are descended from Mor Farquharson, bearer of the royal standard at the battle of Pinkie in 1547, and both bear the Scottish standard as part of their armorial ensigns. The Farquharsons of Invercauld are, or were, descended from an elder son of Mor Farquharson, the Farquharsons of Finzean from a younger son. In 1806, however, the Farquharsons of Invercauld came to an end by the death of James Farquharson, who left no son, but a daughter who married Captain James Ross, R.N., who assumed the name and arms of Farquharson. It is to be presumed that the chieftainship of this ancient clan fell upon the late Dr. Farquharson, and with it whatever glory attached to the wearing of the eagle's feather. Those who had the pleasure of attending the ball given in Mareschal College during the meeting of the Association in 1914, will remember the striking impression created by the late Dr. Farquharson, who came with kilt, dirk, sporran, and all the other accoutrements of a Highland chief.

TUBERCULIN TREATMENT OF PULMONARY TUBERCULOSIS.

DR. MARJORIE HARCOURT (London) writes: For many years, in Australia and America, I used the "tuberculinum purum" of Russian manufacture with all the success from its use that I could have desired. The cases were chiefly of the afebrile type, and in the early stages of the disease those of the febrile type being less amenable to this form of treatment. In every case, without exception, the old method of forced feeding was also adopted, together with any general systemic treatment which was indicated. The tuberculin was used in graduated doses, very slowly increased week by week, and occasionally a week or more was allowed to elapse after the next injection was due. In no case was a patient allowed out of bed for the first twenty-four hours after every injection, often for forty-eight hours or more—until, indeed, there was not any indication of the slightest rise in temperature, and twenty-four hours thereafter. This treatment did not hinder the patients taking graduated exercises as soon as they were out of bed each week, such exercises consisting chiefly in gardening, wood-chopping, house repairing, etc.—anything suitable in individual cases which was also useful. Some of my poorer patients were treated along these lines in their own homes, they or their relations reporting once or twice a week after the first day after injection every week, with such happy results that I can ask for nothing better than to have as many tuberculous cases as I can manage myself personally. No disease has been so amenable to treatment in my hands as pulmonary tuberculosis in the manner I evolved for myself from the teachings of Sir Robert Philip of Edinburgh, whose pupil I was a dozen years ago.

MEDICAL SICKNESS AND ACCIDENT SOCIETY.

AN OLD MEMBER writes: I should like to support the protest of "Dissatisfied" as to the sudden stoppage of the bonus to those going out of benefit. Old members like myself have for years put up with the loss of the quinquennial bonus, looking for the proffered bonus at the end of our time. We feel we are hardly treated by this sudden change from what we were led to expect. I agree with the proposal that a special meeting should be held.

SCALE OF CHARGES FOR ADVERTISEMENTS IN THE BRITISH MEDICAL JOURNAL.

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